...THREE CHARACTERISTICS THAT DIFFERENTIATE US...

Chapter 3

Requirements to Capabilities

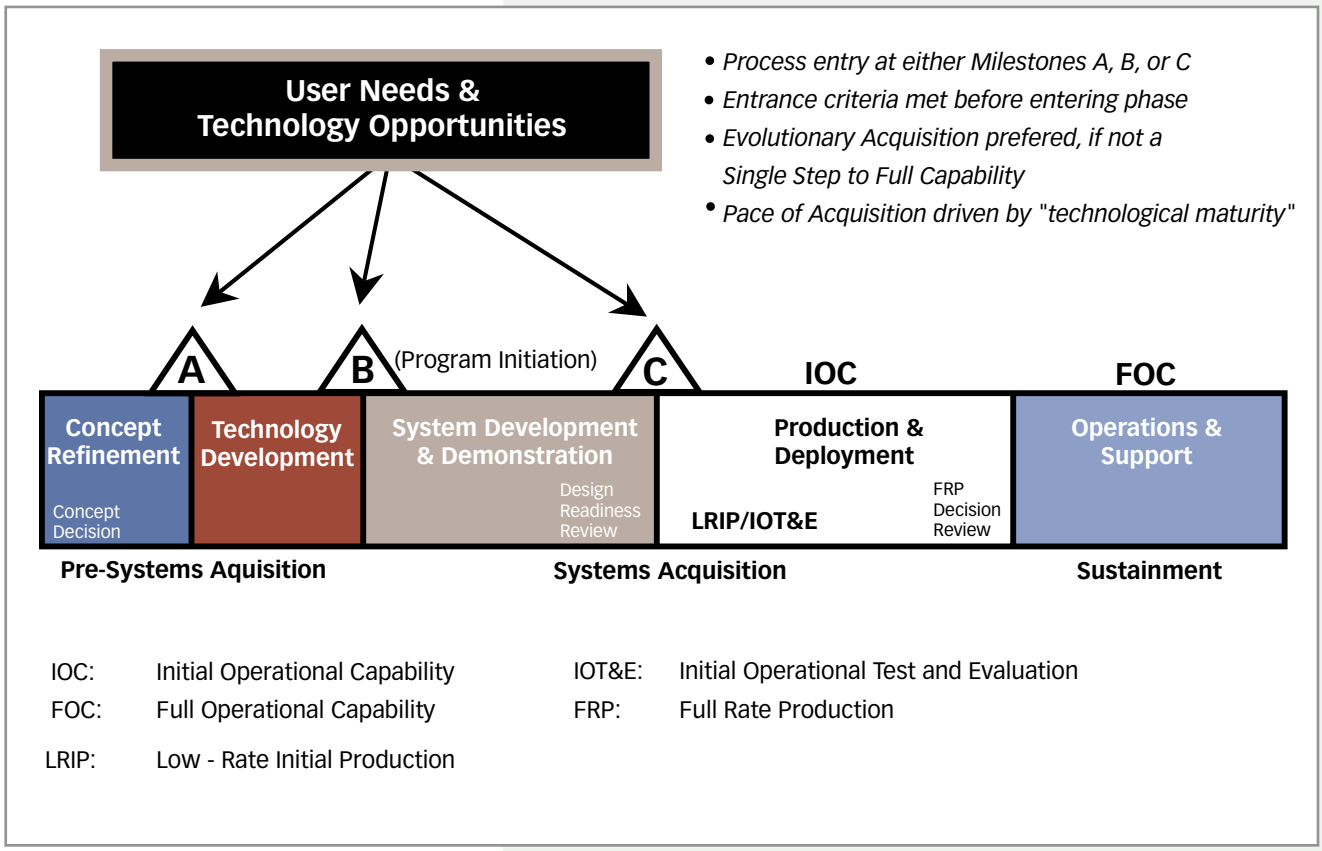
The U.S. naval services—the Navy/Marine Corps team and their Reserve components—possess three characteristics that differentiate us from America's other military services and make us *a uniquely powerful instrument of national policy and will*. First, we operate from the sea, with all of the opportunities for strategic maneuver, operational flexibility, and tactical agility that the sea provides. Second, we are expeditionary. When our ships, aircraft, Sailors, and Marines deploy around the globe, they carry with them what they need to accomplish the mission at hand—with or without host-nation support. Third, in an age of inter-service and coalition interoperability, the Navy and Marine Corps are linked much more closely than the other armed services—Army, Air Force, and Coast Guard—in strategy, doctrine, tactics, training, and operations. All come together to ensure the Navy's ability to carry out Sea Strike, Sea Shield, and Sea Base operations. As the Chief of Naval Operations' *Sea Power 21… A Naval Vision* states, "In a world of violent horizons, the Navy/Marine Corps team will serve America: anywhere, anytime, around the world, around the clock."

DEPARTMENT OF DEFENSE ACQUISITION

The Under Secretary of Defense for Acquisition, Technology, and Logistics—USD (AT&L)—has established a defense acquisition policy directing the service secretaries and Defense Department component heads to execute a single, standardized Defense Department-wide acquisition system. Program costs determine Acquisition Categories (ACAT I and II), with ACAT I having the most significant resource needs.

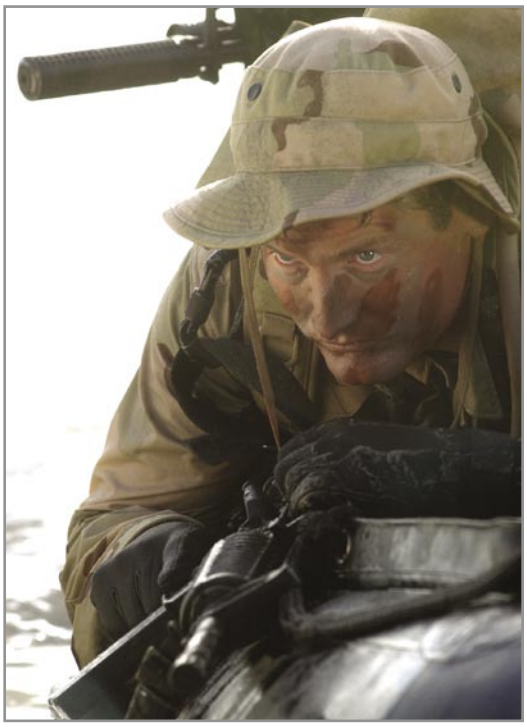
In October 2002, the Deputy Secretary of Defense canceled the DoD system acquisition directives and instructions and replaced them with a policy to create an acquisition environment that fosters efficiency, flexibility, creativity, and innovation. This streamlined process replaces the prescriptive procedures of the Defense Acquisition System Directive (DoDD 5000.1) and the instruction for the Operation of the Defense Acquisition System (DoDI 5000.2). This action also canceled DoD 5000.2-R, replacing it with a guidebook. The new policy and procedures promote evolutionary acquisition, give precedence to performance-based acquisitions and logistics strategies, and emphasize rapid delivery of affordable and sustainable warfighting capability.

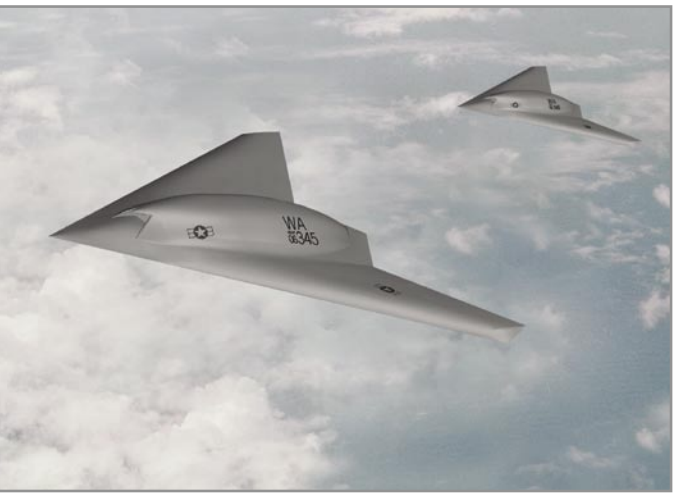
Figure 8: DoDI 5000.2, The New DoD 5000 Model

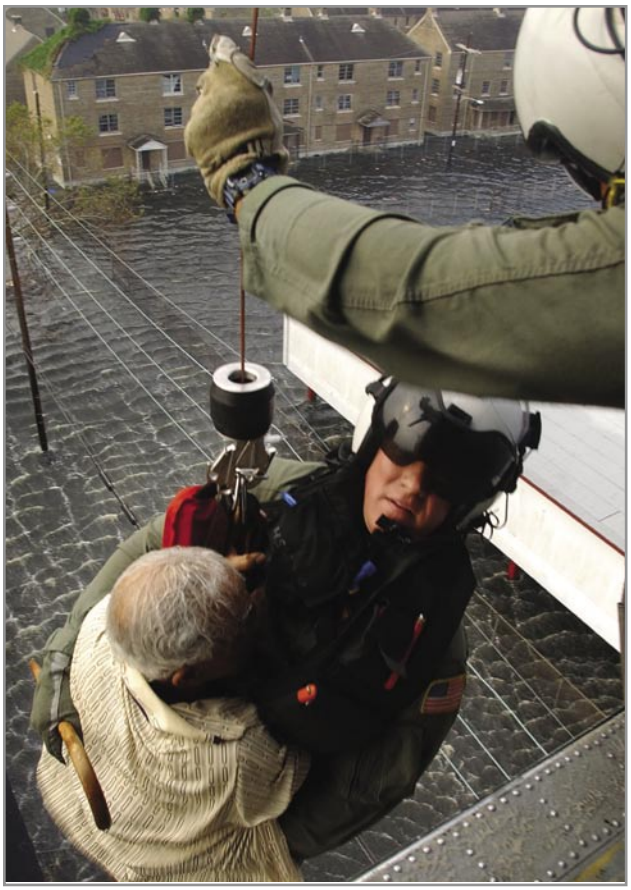


The new policy and guidebook, illustrated in Figure 8, serve to:

- Define two development processes to implement the evolutionary acquisition strategy: Incremental Development in which the end-state requirement is known and the requirement will be met over time in several increments; and Spiral Development in which the desired capability is identified, but end-state requirements are not known at Program Initiation. Requirements for future increments are dependent upon technology maturation and user feedback from initial increments.
- Create an initiative to develop joint integrated architectures based on operational, system, and technical views. The operational view describes the joint capabilities that the user seeks and how to employ them; the systems view characterizes the available technology and systems functionality, and identifies the kinds of systems and integration needed to achieve the desired operational capability; the technical view consists of standards that define and clarify individual systems' technical and integration requirements. Integrated architectures provide the construct for analysis to optimize competing demands.
- Rename and split the Concept and Technology Development Phase as Concept Exploration and Technology Development.
- Replace the Interim Progress Review with the Design Readiness Review.
- Provide for "special interest" as a determination for program ACAT I designation. Special interest includes those programs that have significant technology complexity, congressional interest, and resource implications; are critical to achievement of a capability or set of capabilities; or are joint programs. ACAT I program designation is determined by program cost, estimated by the USD(AT&L), to require eventual total RDT&E expenditure in FY 2000 constant dollars of more than $365 million, or procurement of more than $2.19 billion, or by identification as a "special interest" item by the USD(AT&L).
- Incorporate "materiel" in the analysis of doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) factors from "Joint Vision 2020."
- Reinforce the necessity to design and operationally sustain weapon systems in synchronization with applicable environmental requirements.
- Reflect Joint Chiefs of Staff policy (CJCSI 3170 series) to replace the Mission Need Statement (MNS) and Operational Requirements Document (ORD) with new documents under the Joint Capabilities Integration and Developmental System (JCIDS). These documents are called the Initial Capabilities Document (ICD), Capabilities Development Document (CDD), and the Capabilities Production Document (CPD). The ICD replaces the MNS at Milestone A. The ICD captures capability shortfalls in







terms of broad, time-phased operational goals, and describes requisite capabilities. The common element is capabilities that may be required to resolve a shortfall in warfighting ability and accommodate technology break-throughs or intelligence discoveries. The ICD is to include an analysis of capability solution sets. Capabilities are to be conceived and developed in an integrated joint warfighting context. The CDD replaces the ORD at Milestone B, supporting subsequent program initiation and refining the integrated architecture. Each CDD will have a set of validated key performance parameters (KPPs) that will apply only to that increment of the evolutionary acquisition strategy. The CPD (updated CDD) replaces the ORD at Milestone C. The common element is a focus on capabilities that may be required to resolve a shortfall in warfighting capability or to accommodate technology breakthroughs or intelligence discoveries.

> **Create an Information Technology Acquisition Board (ITAB) to replace the Defense Acquisition Board for review of major automated information system (ACAT IAM) programs.**

The descriptive summaries of the programs addressed throughout Chapter 3 will refer to the current acquisition phase of each program and/or the last milestone it passed, as follows:

Concept and Technology Development (Milestone A) is the pre-systems acquisition phase in which initial concepts are refined and technical risk is reduced. Two major efforts that may be undertaken in this phase are Concept Exploration or Technology Development. Concept Exploration consists of short-term concept studies to refine and evaluate alternative solutions to the initial concept and provide a basis for assessing the merits of these alternatives. Technology Development is an iterative discovery and development process designed to assess the viability of technologies while refining user requirements.

Systems Development and Demonstration (Milestone B) is the phase in which a system is developed. Work in this phase includes reduction of integration and manufacturing risk, while ensuring operational supportability, human systems integration, and producibility design. Demonstration of system integration, interoperability, and utility completes this phase.

Production and Deployment (Milestone C) is the phase in which Operational Test and Evaluation (OT&E) are conducted to determine system effectiveness, suitability, and survivability. The Milestone Decision authority may make a decision to commit to production at Milestone C, either through Low-Rate Initial Production (LRIP) or major defense acquisition programs or Full Production (FP) or procurement for non-major systems.

NAVY DEPARTMENT ACQUISITION

The readiness and warfighting requirements that shape the Navy/Marine Corps Team's acquisition and investment strategies originate with the operating forces and their operational representative (e.g., OPNAV). The execution of these strategies — to develop, acquire, and support a modern, technologically superior, ready force structure — is the responsibility of the Navy's Systems Commands, Direct-Reporting Program Managers (DRPMs), and Program Executive Officers (PEOs). The inset text-box lists key Navy organizations that work with industry on behalf of the Office of the Chief of Naval Operations and the operating forces to develop, test, acquire, and deliver operationally superior and affordable ships and aircraft, combat systems, related equipment, life-cycle support, ashore facilities and installations, and supplies to the Fleet.

As the stewards of the Navy's acquisition and total ownership/life-cycle processes, Systems Commands, DRPMs, and PEOs are responsible for furnishing high-quality yet affordable technologies, systems, platforms, training, and support on par with requirements and priorities of the operating forces; they are critical links in assuring the necessary high return for America's tax dollars. The Navy continues to effect fundamental changes to the way these organizations operate in order to support most effectively and efficiently the Navy's operating forces. Given the expected environment of constrained resources, the ability to be both smart buyers and smart supporters of the Navy's hardware — to embrace best business practices and the tools needed to design, engineer, acquire and sustain the needed equipment—will be a key element in keeping America's naval expeditionary forces capable and ready to meet all challenges of the 21st Century.

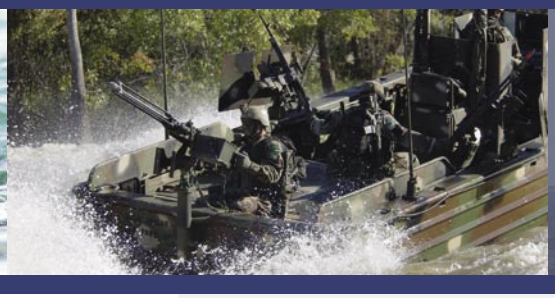
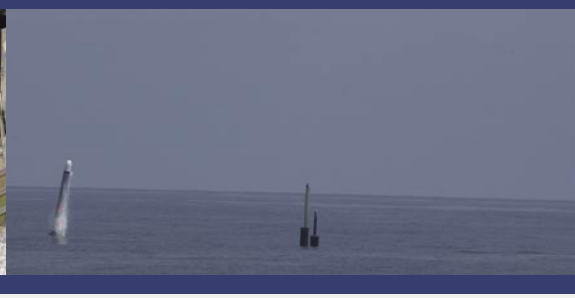
For this reason, the CNO's Sea Enterprise initiative is being led by the Vice CNO and directly involves the Navy Headquarters, the Systems Commands, and the Fleet. The goals are to increase organizational alignment, refine requirements, and reinvest savings to buy the platforms and systems that will transform the Navy. Sea Enterprise will reduce overhead, streamline processes, substitute technology for manpower in a way that will ensure the human warfighter is a key element of the equation, and create incentives for positive change.

The following pages of this chapter provide program summaries of important elements of the Navy's investments to meet national needs and to continue its transformation for the future.

U.S. Navy Systems Commands, Direct-Reporting Program Managers, and Program Executive Officers—

January 2006

- Naval Air Systems Command
- Naval Facilities Engineering Command
- Naval Sea Systems Command
- Naval Supply Systems Command
- Space and Naval Warfare Systems Command
- PEO Air Anti-Submarine Warfare, Assault, and Special Mission Programs
- PEO Aircraft Carriers
- PEO C4I and Space
- PEO Information Technology
- PEO Integrated Warfare Systems
- PEO Joint Strike Fighter
- PEO Littoral and Mine Warfare
- PEO Strike Weapons and Unmanned Aviation
- PEO Ships
- PEO Space Systems
- PEO Submarines
- PEO Tactical Aircraft Programs
- Director, Navy-Marine Corps Intranet
- DRPM Advanced Amphibious Assault Vehicle
- DRPM Distributed Common Ground System - Navy
- DRPM Enterprise Resource Planning
- DRPM Navy/Marine Corps Intranet Chief Engineer
- DRPM Strategic Systems Programs

PLATFORMS
AIRCRAFT

AH-1Z Super Cobra and UH-1Y Huey Upgrade

Description

The AH-1 and UH-1 Upgrade Program will ensure that the MAGTF possesses credible rotary-wing attack and utility support platforms for the next 20 years. The H-1 Upgrade Program will provide 100 UH-1Ys and 180 AH-1Zs to the Warfighter. The H-1 Upgrade Program is designed to reduce life-cycle costs, significantly improve operational capabilities, and extend the service life of both aircraft. 84 percent commonality between the two aircraft will greatly enhance the maintainability and deployability of the systems, with the capability to support and operate both aircraft within the same squadron structure.

The Upgrade Program replaces the current two-bladed rotor system on the UH-1N and AH-1W aircraft with a new four-bladed, all-composite rotor system, coupled with a sophisticated fully integrated, state-of-the-art cockpit. In addition to the new main rotor system and cockpit, the H-1 Upgrade will incorporate a new performance-matched transmission, a four-bladed tail rotor and drive system, and upgraded landing gear for both aircraft. The integrated glass cockpit with modern avionics systems will provide a more lethal platform, as well as enhanced joint interoperability through the digital architecture. Operational enhancements include a dramatic increase in range, speed, payload, and lethality of both aircraft, with a significant decrease in logistics footprint. The UH-1Y will operate at nearly twice the current range with more than double the payload. The AH-1Z will realize similar performance increases, with the ability to carry twice the current load of precision-guided munitions.

The H-1 Upgrade Program is an economical and comprehensive upgrade of both UH-1N and AH-1W helicopters, which will resolve existing operational safety issues while significantly enhancing the capability and operational effectiveness of the attack and utility helicopter fleet. A key modernization effort, the H-1 Upgrade will provide a bridge until the introduction of an advanced rotorcraft design. Due to substantial operational demands and aircraft attrition, both resulting from the Global War on Terrorism, the Marine Corps has adopted a "build new" strategy for the UH-1Y beginning in FY 2006 and is currently examining a "build new" strategy for the AH-1Z, in order to preclude significant inventory shortfalls.

Status
The preliminary design review was approved in June 1997, and the critical design review was completed in September 1998. LRIP began in the first quarter FY 2004. Five EMD (Engineering and Manufacturing Design) aircraft have been produced, four of which will eventually become fleet assets and one aircraft (without an integrated avionics suite) will be used for live-fire test and evaluation. Operational Evaluation of both aircraft is scheduled to begin in March 2006 at NAWC China Lake. The UH-1Y is scheduled to meet IOC in the fourth quarter of FY 2008 while the AH-1Z will meet IOC in in the fourth quarter of FY 2011. Currently, FOC will be met for the UH-1Y in FY 2012 with the AH-1Z in FY 2018.

Developers
Bell Helicopter Textron; Fort Worth and Amarillo, Texas

AV-8B Harrier II+

Description
The AV-8B Harrier II is a single-seat, light attack aircraft that provides offensive air support to the MAGTF. By virtue of its Vertical/Short Take-Off and Landing (V/STOL) capability, the AV-8B can operate from a variety of amphibious ships, rapidly constructed expeditionary airfields, forward sites (e.g., roads), and damaged conventional airfields. Two variants of the aircraft are in service operationally: the Night Attack and the Radar/Night Attack Harrier. The Night Attack Harrier improved upon the original AV-8B design through incorporation of Navigation, Forward-Looking InfraRed (NAVFLIR) sensor, a moving map, night vision goggle compatibility, and a higher performance engine. The current Radar/Night Attack Harrier, or Harrier II+, has all the improvements of the Night Attack aircraft plus the AN/APG-65 multi-mode radar. The fusion of night and radar capabilities allows the Harrier to be responsive to the MAGTF's needs for expeditionary, night, and adverse weather offensive air support.

Status
The AV-8B Harrier Open Systems Core Avionics Requirement (OSCAR), which updates obsolete software and computer equipment, has entered service. OSCAR with Operational Flight Program H2.0 enables the AV-8B to employ both 1,000 and 500 pound variants of the Joint Direct Attack Munition and provides tremendous improvements in radar and Litening advanced targeting pod capability.

The Litening advanced targeting pod provides the AV-8B with a significant improvement in its lethality and survivability. This third-generation, forward-looking infrared set, dual field-of-view TV seeker, and infrared marker provides improved target recognition and identification, while the laser designator and laser spot tracker provide precision targeting capability. Some Litening pods have also been equipped with a video downlink, which allows real-time video to be sent to ground-based commanders and

forward-air controllers. This facilitates time-sensitive targeting and reduces the risk of fratricide and collateral damage.

In order to maintain a world-class training environment, the two-seat TAV-8B trainers are undergoing an upgrade program that adds new color displays, night vision goggle-compatible lighting, and a more powerful and reliable Rolls Royce Pegasus (408) engine. These improvements are increasing the training capability of the AV-8B fleet replacement squadron, as well as the abilities of our replacement pilots reporting to their fleet squadrons. The enhancements to the Harrier are a critical link for providing continued support to the MAGTF, until the TacAir Integration implementation and Joint Strike Fighter (JSF) transition are complete.

Developers
Boeing; St. Louis, Missouri

E-6 Mercury Airborne Command Post/TACAMO Aircraft

Description
The E-6 platform, derived from the Boeing 707, provides the Commander, U.S. Strategic Command with the command, control, and communications capability needed for execution and direction of strategic forces. Designed to support a robust and flexible nuclear deterrent posture well into the 21st Century, the E-6 performs VLF emergency communications, the Strategic Command Airborne Command Post mission, and Airborne Launch Control of ground-based ICBMs. It is the Navy's only survivable means of nuclear command and control.

Status
In order to sustain and improve E-6 capability, the Block I modification program was developed. The contract for Block I was awarded to Rockwell Collins in March 2004 and it is designed to repair a number of aircraft deficiencies identified by Strategic Command. IOC is planned for 2010.

Developers
Rockwell Collins; Cedar Rapids, Iowa

EA-6B Prowler Airborne Electronic Attack Aircraft

Description
The EA-6B Prowler provides Airborne Electronic Attack (AEA) and Anti-Radiation Missile (ARM) capabilities against enemy radar and communications systems. In addition to enhancing the strike capabilities of carrier air wings and Marine expeditionary forces, an expeditionary Prowler force has provided AEA capability during numerous joint and allied operations since 1995 against both traditional and non-traditional target sets in support of ground forces. These capabilities continue to be demonstrated in the Global War on Terrorism where EA-6B operations in Afghanistan and Iraq protect coalition forces and disrupt critical communications links. The enormous demands for AEA in Operation

Enduring Freedom and Operation Iraqi Freedom have driven EA-6B utilization rates to record levels.

Status
The Improved Capability (ICAP) III upgrade reached IOC in September 2005 with the "Cougars" of VAQ-139. This generational leap in electronic attack capability will deploy for the first time in 2006. The ICAP III includes a completely redesigned receiver system (ALQ-218), new displays, and MIDS/Link-16, which will dramatically improve joint interoperability. Additionally, the ALQ-218 will also form the heart of the EA-18G "Growler" AEA system–the follow on platform for the EA-6B.

Developers
Northrop Grumman; Bethpage, New York

EA-18G Growler Airborne Electronic Attack Aircraft

Description
The EA-18G Growler will replace the EA-6B Prowler as the Navy's tactical electronic attack aircraft—the only aircraft of its kind in DoD's inventory. Like the Prowler, the EA-18G will provide full-spectrum electronic attack to counter enemy air defenses and communication networks. The Growler will maintain a high degree of commonality with the F/A-18F, retaining the latter's strike-fighter and self-protection capabilities while providing air-to-air self-escort to free other assets for other strike-fighter tasking.

Status
The EA-18G Growler is on schedule and under budget as it progresses toward its 2009 IOC. The aircraft completed its Critical Design Review (CDR) in April 2005 and will fly its first flight in fourth quarter, FY 2006 with an IOC in 2009. An inventory objective of 90 aircraft is planned to support a 10-squadron force structure. Initial procurement of the first four aircraft begins in FY 2006.

Developers
Boeing; St. Louis, Missouri
Northrop Grumman; Bethpage, New York

F/A-18 A-D Hornet Strike-Fighter Aircraft

Description
The F/A-18 Hornet is Naval Aviation's principal strike-fighter. This state-of-the-art, multi-mission aircraft serves the Navy and Marine Corps, as well as the armed forces of several allied and friendly countries. Its reliability, maintainability, safety record, high performance, and multiple weapons-delivery capability highlight the Hornet's success. Budgeted improvements to the original Hornet A/C/D variants have provided significant warfighting improvements, including the addition of the Global Positioning System (GPS), Multi-Functional Information Distribution System (MIDS), AIM-9X Sidewinder/Joint Helmet-Mounted Cueing

System, Combined Interrogator Transponder, Joint Direct Attack Munition/Joint Stand-Off Weapon (JDAM/JSOW) delivery capability, and Digital Communication System for close-air support. The aircraft's weapons, communications, navigation, and Defensive Electronic Countermeasures systems are also being upgraded to ensure combat relevance.

Status

Although the F/A-18A through D are out of production, the existing inventory of approximately 681 Navy and Marine Corps aircraft will continue to comprise half of Naval Aviation's strike assets through 2012, and will continue to serve in active squadrons until 2023.

Developers

Boeing; St. Louis. Missouri
General Electric; Lynn, Massachusetts

F/A-18E/F Super Hornet Strike-Fighter Aircraft

Description

The F/A-18E/F Super Hornet provides significant improvements in combat range, payload, survivability, and growth capacity required to keep the strike-fighter force lethal and viable well into the 21st Century. There is extensive commonality of weapons systems, avionics, and software between F/A-18 variants, and the infrastructure supporting the Super Hornet builds upon existing organizations. The F/A-18E/F is replacing the F-14 and early model F/A-18s. The lethality, flexibility, reliability, and survivability of the F/A-18E/F make it the right aircraft to fulfill missions associated with regional and littoral conflicts.

Status

Aircraft F/A-18E-1 first flew on 29 November 1995. Full-rate production deliveries commenced in October 2001. The Navy awarded a multi-year contract, compared to five single-year contracts, for the procurement of 222 aircraft from 2000-2004 and saved the taxpayers more than 7.4 percent ($700 million). A second multi-year contract was awarded in FY 2004 for 210 aircraft procured in 2005 through 2009, saving the taxpayer more than $1 billion over the single-year price. In June 2002 the Navy awarded a multi-year contract for the production of 480 engines, saving the taxpayers $51 million. The first Super Hornet squadron to deploy, VFA-115 (F/A-18E), deployed onboard the USS *Abraham Lincoln* (CVN 72) in the summer 2002 and led strikes into Iraq on the opening night of Operation Iraqi Freedom. The second and third Super Hornet squadrons to deploy, VFA-14 (F/A-18E) and VFA-41 (F/A-18F), deployed onboard the USS *Nimitz* (CVN 68) in the spring 2003. This deployment initiated EOC for the Shared Reconnaissance Pod (SHARP), the Joint Helmet Mounted Cueing System (JHMCS), the Multifunctional Information Distribution System (MIDS), and the Advanced Targeting Forward-Looking Infra-Red (ATFLIR) system. Additionally, ATFLIR achieved IOC with VFA-102 in September 2003. Lot 25 F/A-18E/Fs and above will

have Advanced Mission Computers with computer software using Higher Order Language (HOL). Pacific Fleet aircraft will be based at NAS Lemoore, California. The first Super Hornet squadron was forward deployed to NAF Atsugi, Japan in November 2003. NAS Oceana, Virginia and MCAS Cherry Point, North Carolina have been chosen as the Atlantic Fleet home bases.

Developers
Boeing; St. Louis, Missouri
General Electric; Lynn, Massachusetts

F-35 Joint Strike Fighter (JSF)

Description
The F-35 JSF program will deliver a transformational family of next-generation strike aircraft combining stealth and enhanced sensors to provide a lethal, survivable, supportable, and affordable tactical jet aviation strike fighters that complement the F/A-18E/F. The Navy Carrier Variant (CV), the Marine Corps Short Takeoff and Vertical Landing (STOVL) and Air Force Conventional Takeoff and Landing (CTOL) "family of aircraft" design share a high level of commonality while meeting U.S. service and allied needs. The keystone of this effort is a mission systems avionics suite that delivers unparalleled interoperability between U.S. armed services and coalition partners. Agreements for international participation in System Development and Demonstration (SDD) have been negotiated with Australia, Canada, Denmark, Italy, the Netherlands, Norway, Turkey, and the United Kingdom. Security Cooperation Partnership memorandums of understanding have been established with Israel and Singapore.

Status
The JSF is in its fifth year of a planned 12-year SDD program. The 5 May 2005 DAB confirmed that the program's "re-plan" to ensure weapon systems performance and to reduce weight had been successful. It also required the Cost Analysis Improvement Group (CAIG) to provide a cost estimate update after the JSF Critical Design Review (CDR) in February 2006 and directed the Networks and Information Integration (NII) Overarching Integrated Product Team (OIPT) leader to lead "net-centric" reviews to migrate over time to a full net-centric capability. The first SDD flight is scheduled for fourth quarter FY 2006 (CTOL variant). The first STOVL flight will be in the first quarter FY 2008, and the first CV flight in second quarter FY 2009. The IOC for the Marine Corps is 2012, and 2013 for the Navy. All Key Performance Parameters (KPPs) are projected to be met at IOC. The DoD Base Realignment and Closure Commission (BRAC) 2005 directed that the first JSF Integrated Training Center will be at Eglin Air Force Base.

Developers
Lockheed Martin; Fort Worth, Texas
Pratt Whitney (PW F135 engine); East Hartford, Connecticut

Unmanned Combat Air System (UCAS)

Description

In 2000, the Navy partnered with the Defense Advanced Research Projects Agency (DARPA) to define and demonstrate the value and feasibility of Unmanned Combat Air Vehicles (UCAVs). The Navy directed the demonstration project to explore multi-mission vehicles that cover surveillance/reconnaissance, strike, and suppression of enemy air defenses. The Navy has stressed an initial emphasis on the penetrating surveillance/reconnaissance role, where target identification and precise location capability best leverages the significant Navy investment in stand-off weapons. The primary focus for the Navy remains on carrier basing of the envisioned low-observable, multi-mission unmanned vehicle. In addition, it will reduce risk in other areas in preparation for the follow-on acquisition program. This acquisition program will field aircraft carrier-based Navy UCAVs in the 2018 time frame.

Status

The program is pursuing design for a carrier-based, low-observable, persistent ISR unmanned platform. Planning is now underway for a demonstration phase and follow-on operational assessment. While maintaining the goal of demonstrating a carrier-based multi-mission UCAV, the program intends to develop a C4ISR and command and control architecture for the family of UCAS vehicles.

Developers

To be determined.

VH-71A Presidential Helicopter Replacement

Description

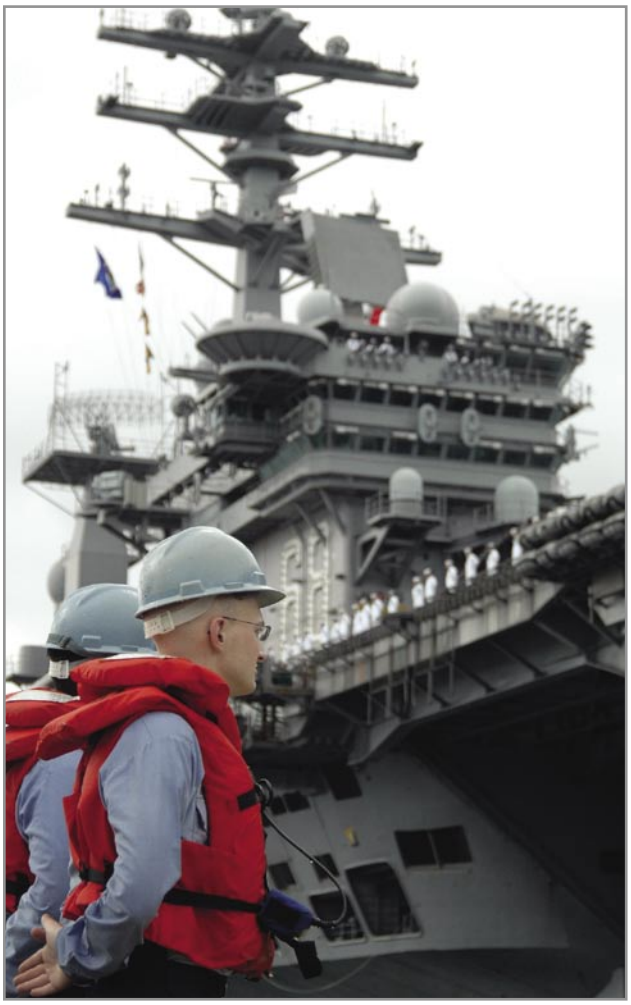
The VH-3D/VH-60N presidential helicopter replacement, recently designated VH-71A, is a conventional helicopter based on the Agusta Westland EH-101. It will provide safe and timely transportation for the President and Vice President of the United States, foreign heads of state, and others as directed by the White House Military Office. When the President is onboard Marine One, this aircraft is the Commander-in-Chief's primary command and control platform and must provide him with the flexibility and capabilities necessary to execute the duties of his office. Its capabilities, which will be delivered in two increments, are split into four functional areas: aircraft operations, communications, survivability, and Presidential accommodations. VH-71A will have increased capabilities in these areas, while retaining core capabilities carried forward from the VH-3D and VH-60N.

Status

Milestone B/C Defense Acquisition Board held on 12 January 2005. Milestone B was approved for Increment I and II System Development and Demonstration (SDD). Milestone C was approved for five pilot production Increment I aircraft. The SDD Contract for Increment I and II was awarded to Lockheed Martin on 28 January 2005.

Developers

Lockheed Martin's team includes;
Agusta Westland (design)
Bell Helicopter (production)
General Electric (engines)
Lockheed Martin Systems Integration; Owego, New York



SURFACE AND EXPEDITIONARY WARFARE SHIPS AND CRAFT

AIRCRAFT CARRIERS

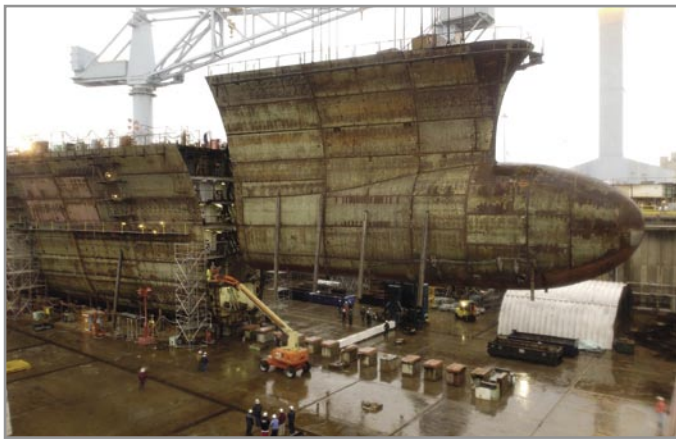
Nimitz (CVN 68) and CVN 21 Program

Description

The nine *Nimitz*-class nuclear-powered aircraft carriers currently in active service comprise three-quarters of the Navy's aircraft carrier force. Since USS *Nimitz* (CVN 68) was commissioned in 1975, these ships have been replacing our aging, fossil-fueled carriers on a one-for-one basis. In doing so, they have preserved and recapitalized aircraft carrier strike group force levels to meet Fleet Response Plan (FRP) and presence requirements for Combatant Commander in support of national goals. The mission of the *Nimitz*-class aircraft carrier is to support and operate aircraft that engage in attack, survey, and conduct electronic warfare against sea-borne, air-borne, and land-based targets in support of Joint and Coalition forces. America's carriers are forward-deployed throughout the world in support of U.S. strategy and commitments. Our carriers are also playing an increasingly important role as the Navy adjusts its emphasis toward littoral regions, and forward-deployed, land-based forces are brought home to the United States.

Since the baseline *Nimitz* design was finalized in the 1960s, little has been invested in research and development that could have incrementally incorporated leading-edge technologies and systems into these premier capital ships. It is primarily for this reason that the Navy has embraced a program to develop, acquire, and operate a new design aircraft carrier to replace all U.S. carriers in service today. In 1993, the Navy established a future sea-based air platforms working group to investigate the requirements and available technologies and systems—to ensure that a new class of aircraft carriers could capture elements of the Revolutions in Military and Business Affairs. Based on these initial studies, the Navy established the CVN 21 Program to develop an evolutionary-design, next-generation, nuclear-powered aircraft carrier. The lead ship of the CVN 21-class, CVN 78, is scheduled for delivery to the Fleet in 2015. This class of aircraft carriers will incorporate such features as: a new, more efficient nuclear propulsion plant, an Electro-Magnetic Aircraft Launch System (EMALS), Advanced Arresting Gear (AAG), and a nearly three-fold increase in electrical generation capacity over that of *Nimitz*-class carriers. These improvements, coupled with an expanded Flight Deck and other topside changes designed to increase operational efficiency, will provide higher sortie generation rates. At the same time, manpower requirements for the ship and air wing will be significantly reduced from today's levels.

Quality of life improvements for the crew are also a primary focus during the design phase for CVN 21, as it is anticipated that this



class of aircraft carrier will sail the world's oceans for the next 100 years. The principal design objectives for the ships of the CVN 21 Program are to provide a flexible infrastructure that will facilitate the insertion of new warfighting capabilities as they evolve and continue to reduce total ownership costs during each carrier's 50-year service life. Meeting these objectives are a high priority for the Navy, and will ensure aircraft carriers remain the centerpiece of *Sea Power 21*—capable of meeting the daunting operational requirements into the next century.

Status
There are nine *Nimitz*-class nuclear-powered aircraft carriers in active service as of 2006. USS *George H.W. Bush* (CVN 77), the tenth and final ship of the class, is currently under construction at the Northrop Grumman Newport News Shipyard in Newport News, Virginia. CVN 77 is scheduled for launch in October 2006, with delivery expected in November 2008. CVN 77 is a modified-repeat of the USS *Ronald Reagan* (CVN 76) and will be the numerical replacement for USS *Kitty Hawk* (CV-63), which retires in 2008 after 47 years of service. Aircraft carriers subsequent to CVN 77 will belong to the CVN 21-class, with delivery of the lead ship, CVN 78, scheduled for 2015. CVN 79, the second ship of the CVN 21, is scheduled for delivery in 2019.

CVN 78 is the numerical replacement for the Navy's first nuclear-powered aircraft carrier, USS *Enterprise* (CVN 65), which is scheduled for decommissioning in 2013 after more than 52 years of operational service.

Developers
Northrop Grumman; Newport News, Virginia

SUBMARINES

Advanced SEAL Delivery System (ASDS)

Description
This combat submersible is 65 feet long, is operated by a two-man crew, and can carry Navy SEAL personnel or other Special Operations Forces (SOF). The ASDS is a multi-mission platform capable of personnel delivery or intelligence operations. It is launched from one of two host submarines, USS *Charlotte* (SSN 766) or USS *Greeneville* (SSN 772), much like the Deep Submergence Rescue Vehicle (DSRV). The ASDS eliminates the extended exposure to water and increased atmospheric pressure inherent with in-service wet submersible SEAL Delivery Vehicles (SDVs) and carries improved sensors and communications equipment, resulting in improved personnel and equipment performance.

Status
The first ASDS is home ported with SEAL Delivery Vehicle Team

ONE (SDVT ONE) in Pearl Harbor, Hawaii. The ASDS completed OPEVAL in the summer of 2003 and conducted training exercises in the Pacific—proving the capability to operate from a forward operating base. Progress toward building the full complement of ASDSs is dependent on improving the operational reliability of ASDS Hull 1. Future SSGNs and *Virginia* (SSN 774)-class submarines will host the ASDS as the program proceeds.

Developers
Northrop Grumman; Annapolis, Maryland

SSGN Nuclear-Powered Guided-Missile Submarine

Description
The first four of the *Ohio* (SSBN 726)-class Trident fleet ballistic missile submarines (SSBNs) are being converted to nuclear-powered guided missile and special-operations submarines (SSGNs). The *Ohio*-class SSBN is one of the Navy's contributions to the nation's strategic deterrent posture. The first eight *Ohio*-class were configured to carry 24 Trident I/C4 submarine-launched ballistic missiles (SLBMs). The ninth ship, the USS *Tennessee* (SSBN 734) and all later ships are armed with the Trident II/D5missile system. Trident missiles are capable of carrying Multiple Independently Targeted Reentry Vehicles (MIRVs); in operation Trident II/D5 missiles have been declared at eight MIRV warheads while Trident I/C4 missiles have been declared at six under the Strategic Arms Reduction Treaty (START). All 18 of the *Ohio*-class SSBNs have been commissioned; the final ship of the class, the USS *Louisiana* (SSBN 743), joined the fleet in FY 1997. In FY 2000, the last four of the original eight ships began conversion to carry the Trident II/D5 missile. USS *Alabama* is the last ship to undergo D5 conversion which began in 2006.

The first four *Ohio*-class SSBNs are being converted to the SSGN configuration and will be able to carry up to 154 Tomahawk (TLAM/TACTOM) land-attack missiles to conduct large-volume strike with surprise. While on station, with unparalleled nonprovocative persistent presence, the SSGN will prepare the knowledge battlespace using UUVs and other sensors to enable access for follow-on forces. The SSGN will also have the capability to support a Special Operations Force (SOF) contingent of up to 66 personnel for an extended period of time, providing clandestine insertion and retrieval via built in lockout chambers, dry deck shelters, or the Advanced SEAL Delivery System (ASDS). Operating with two crews and using the existing Trident infrastructure will allow this potent warfighting capability to have a 70 percent in-theater presence. Additionally, the large payload and ocean interface of 24 seven-foot diameter tubes will allow these transformational submarines to leverage future payloads and sensors, thereby increasing the submarine force's future capabilities.

Status
The first two ships, the USS *Ohio* (SSBN 726) and USS *Florida* (SSBN 728), began their refueling and conversion overhauls in FY2003. The USS *Michigan* (SSBN 727) and USS *Georgia* (SSBN 729) began their refueling and conversion overhauls in FY 2004 and FY 2005, respectively. The USS *Ohio* delivered to the Navy at the end of 2005. The first SSGN will be operational in FY 2007. The anticipated cost for all four SSGN conversions is approximately $4 billion.

Developers
General Dynamics Electric Boat; Groton, Connecticut

SENSORS
AIRBORNE

APG-79 Active Electronically Scanned Array (AESA) Radar System

Description
APG-79 AESA Phase I upgrade provides multi-mode function flexibility while enhancing performance in the air-to-air arena, hostile electronic countermeasures environments, and air-to-ground targeting functions. Phase II will provide significant electronic warfare improvements to target hostile emitters while providing aircraft electronic protection and electronic attack functions. Growth provisions will allow for reconnaissance capability through the use of synthetic aperture radar technology and improved hardware and software.

Status
The APG-79 completed subcontractor competition in November 1999, and the Engineering and Manufacturing Development (EMD) contract was awarded in February 2001 to reach IOC in 2006. AESA Total Phase I program procurement is 415 systems, 280 forward fit and 135 retrofit. AESA Milestone C and LRIP II approval was received in January 2004, for initial delivery with Lot 27 Super Hornets in FY 2005.

Developers
Boeing; St. Louis. Missouri
Raytheon; El Segundo, California

ASQ-228 Advanced Targeting Forward-Looking Infra-Red (ATFLIR)

Description

The ATFLIR will provide the F/A-18A+/C/D/E/F with a significantly enhanced capability to detect, track, and attack air and ground targets. New laser-guided and GPS standoff weapons systems and higher-altitude attack profiles require improved performance over the current AAS-38/46 Targeting FLIR. The ATFLIR is designed to provide a quantum leap in operational effectiveness to fully support the standoff precision strike mission. Improved reliability and maintainability will increase operational availability while reducing total ownership costs.

Status

ATFLIR completed Phase I Operational Test and Evaluation in September 2003 and was determined to be operationally suitable and effective, and was recommended for further fleet introduction. ATFLIR achieved IOC with VFA-102 in September 2003 and demonstrated its combat capability in support of Operation Iraqi Freedom. The program was awarded MS III/FRP decision on 17 October 2003. The Navy will procure 66 ATFLIR in FY 2005. Program objective is 477 systems.

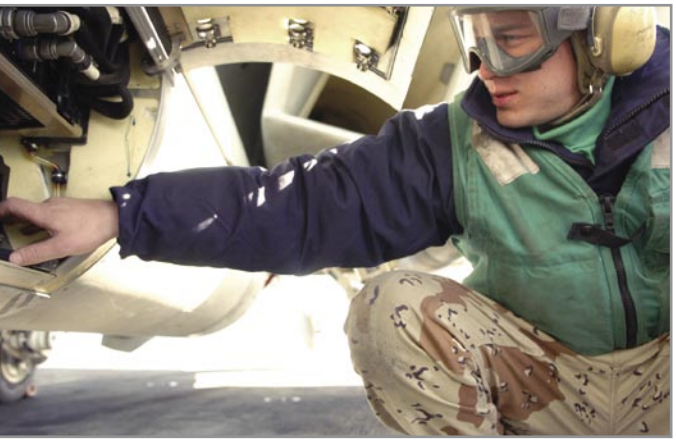
Developers

Boeing; St. Louis, Missouri
Raytheon; El Segundo, California

ASD-12V Shared Reconnaissance Pod (SHARP)

Description

The SHARP replaces the F-14 Tactical Airborne Reconnaissance Pod System (TARPS) and will be carried on the F/A-18F to support strike warfare, amphibious warfare, and anti-surface warfare decision-making. SHARP provides near-real time, dual-band EO/IR medium and high altitude standoff imagery. SHARP incorporates NITF formatted day/night digital imagery utilizing the USQ-123 Common Data Link-Navy (CDL-N) for real time connectivity. SHARP deployed with VFA-41 in support of Operation Iraqi Freedom in 2003 and with VFA-102 as part of the forward-deployed naval forces in Japan.



Status

SHARP Milestone III is scheduled for FY 2006, with IOC in October 2006.

Developers

Raytheon; Indianapolis, Indiana
Recon/Optical; Barrington, Illinois
L-3 Communications Systems West; Salt Lake City, Utah

SUBSURFACE

BYG-1 Submarine Combat Control System

Description

The BYG-1 is the combat control system common across all submarine platforms (except *Ohio*-class (SSBN 726)) which incorporates tactical control, weapon control, and Tactical Local Area Network (TacLAN) functions into a single procurement program. BYG-1 allows the submarine Navy to rapidly update the ship safety tactical picture, integrates the common tactical picture into the battle group, improves torpedo interfaces, and provides tactical Tomahawk capability. BYG-1 systems will be updated continuously with hardware enhancements to address COTS obsolescence and capability improvements as defined by the Advanced Processor Build (APB) process. These updates are referred to as Tech Insertion (TI) kits and are differentiated by year of development (i.e., TI00, TI04, and so on). The TI upgrades provide the baseline for all future BYG-1 procurements. In addition, this budget also provides tech insertion "kits" to update existing BYG-1 platforms.

Status

BYG-1 is scheduled to be installed on all attack-and guided-missile submarines by FY 2012.

Developers

Raytheon; Portsmouth, Rhode Island
General Dynamics Advanced Information Systems; Manassas, Virginia
Progeny; Manassas, Virginia
Lockheed Martin; Eagan, Montana

WEAPONS

AIRBORNE

AGM-88E Advanced Anti-Radiation Guided Missile (AARGM)

Description

The latest evolution of the HARM weapon system is the Navy's AGM-88E AARGM. The AGM-88E is an ACAT-IC SDD program with a planned IOC in FY 2009. AARGM was successfully demonstrated as an ATD and Quick Bolt ACTD sponsored by European Command. The AGM-88E project upgrades legacy HARM with a new guidance section incorporating multi-sensor, multi-spectral digital anti-radiation homing detection capability, GPS/INS guidance, and a millimeter wave terminal seeker. AARGM also includes a netted situation awareness/targeting capability and weapon impact assessment reporting via direct connectivity with national technical means. The U.S. DoD and the Ministry of Defense of the Republic of Italy have signed an international Memorandum Of Agreement for the cooperative development of the AGM-88E. The

AARGM system will provide the U.S. Navy/Marine Corps and the Italian Air Force with a transformational and affordable Destruction of Enemy Air Defenses (DEAD) and time-sensitive strike capability upgrade to the legacy HARM.

The legacy HARM program was a joint-service program with the Navy as the lead service. HARM is the Navy's only anti-radiation, defense-suppression, air-to-surface missile. Employed successfully in naval operations for decades, HARM is designed to destroy or suppress broadcasting enemy electronic emitters, especially those associated with radar sites used to direct anti-aircraft guns and surface-to-air missiles. The AGM-88B (Block IIIA) and the AGM-88C (Block V) are the current fielded fleet configurations of the HARM.

Status
FY 1992 was the last year of production of Navy all-up HARM rounds. The AGM-88E AARGM planned IOC is FY 2009. The AGM-88E program plans conversion of 1,750 older AGM-88B weapons for the F/A-18C/D/E/F and EA-18G aircraft.

Developers
AARGM: ATK; Woodland Hills, California
HARM: Raytheon; Tucson, Arizona

AGM-154 Joint Standoff Weapon (JSOW)

Description
A new family of Stand-off Outside Point Defense (SOPD) weapons was added to the fleet with the introduction of the JSOW in 1999. A joint Navy/Air Force weapon-development program, with the Navy as the lead service, JSOW replaces five types of the aging air-to-ground weapons currently in the naval inventory. With war-proven effectiveness, the JSOW family of precision-guided weapons allows naval aircraft to attack targets at increased stand-off distances, greatly increasing aircraft and aircrew survivability. The JSOW is usable in adverse weather conditions and gives aircrews the ability to attack multiple targets in a single sortie. The JSOW family uses a common weapon body or "truck" for all variants. The AGM-154A variant carries BLU-97 combined-effect bomblets for use against area targets. The AGM-154C (Unitary) was developed with a penetration warhead (BROACH).

Status
AGM-154A reached IOC in 1999, and the AGM-154C variant reached IOC in FY 2005. Procurement of JSOW C continues across the FYDP with a total of 2,765 units FY 2006-2011.

Developers
Raytheon; Tucson, Arizona

AIM-9X Sidewinder Short-Range Air-to-Air Missile

Description

A major modification to the AIM-9M Sidewinder, the AIM-9X is a joint USN/USAF program that upgrades the missile with a staring focal plane array in the seeker, an extremely agile airframe, and state-of-the-art signal processors resulting in enhanced target acquisition and missile kinematics, and improved infrared counter-countermeasures capabilities. The missile will provide U.S. fighters with air superiority well into the 21st Century. When coupled with the Joint Helmet-Mounted Cueing System, the Sidewinder's high off-boresight capability will revolutionize the way these air-to-air missiles are employed. Current integration is underway for both these systems onboard the F/A-18A+/C/D Hornet and the F/A-18E/F Super Hornet. Integration is planned for the Joint Strike Fighter (JSF)

Status

Operational testing was completed in summer 2003. The first LRIP contract deliveries began in September 2002 with the second and third LRIPs awarded in November 2002 and November 2003, respectively. Approval for the fourth LRIP was received July 2003 and the full-rate production contract was awarded in November 2004. AIM-9X Block II is a P3I program that will incorporate a new AOTD and datalink. This will double the maximum range and greatly increase weapons effectiveness throughout the weapons engagement zone. Block II production will begin with the Lot 8 contract award with deliveries beginning in 2009. The program funds 1,116 AIM-9X missiles in the FYDP, including 165 in FY 2006.

Developers

Raytheon; Tucson, Arizona

AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM)

Description

The AIM-120 AMRAAM missile is currently deployed on the F/A 18A+/C/D Hornet and the F/A-18E/F Super Hornet, and will be deployed on the EA-18G and Joint Strike Fighter (JSF) aircraft. Joint Air Force and Navy procurement of AMRAAM continues and deliveries of the AIM-120C-7 are under way. The AIM-120C Pre-Planned Product Improvement (P3I) Program is a key factor in maintaining medium-range air superiority. This modernization plan includes clipped wings for internal carriage, a propulsion enhancement program, increased warhead lethality, and enhanced electronic counter-countermeasures (ECCM) capabilities through hardware and software upgrades. Ultimately, AMRAAM will be the Department of the Navy's sole Medium/ Beyond Visual Range (M/BVR) missile. As part of the continuing weapons neck-down strategy, the radar-guided AIM-54C Phoenix has been phased out. The AIM-7 Sparrow will be phased out by the end of the FYDP and no further software or hardware improvements are planned for this legacy weapon.

Status
Deliveries of the AIM-120C began reaching the fleet in 1996. The AIM-120C-7 configuration is a product of P3I Phase 3 and is scheduled to achieve IOC in FY 2006. Continued procurement of the joint AMRAAM, with a P3I Phase 4 contract for the AIM-120D missile, will provide significant network-centric warfare capability, GPS, improved high-off-boresight capability, and missile kinematics. Phase 4 AMRAAM is scheduled to IOC in FY 2008. Planned procurement across the FYDP is 841 missiles, including 101 in FY 2006.

Developers
Raytheon; Tucson, Arizona

GBU-10/12/16/24 Laser-Guided Bomb (LGB)

Description
The LGB is a joint Navy/Air Force effort with the Air Force as the lead/executive service for procurement. An LGB is comprised of an MK-80/BLU-series warhead fitted with a laser-guidance kit, consisting of a Computer Control Group (CCG) mounted on the nose of the bomb body and a rear-mounted Airfoil Group (AFG). The warhead is initiated by an electronic fuse housed in the aft section of the bomb body. The seeker, housed in the CCG, senses laser energy and sends signals to the CCG canards to guide the weapon to the reflected energy spot. The laser energy can be applied to the target by ground or airborne designators, and even self-designated by laser-configured aircraft. LGBs include Paveway I, which has been retired; Paveway II, the current variant (GBU-10, 12, and 16) that uses MK-80/BLU series general-purpose bomb bodies; and Paveway III (GBU-24) that uses the BLU-109 bomb body and incorporates state-of-the-art guidance and control features. Paveway II LGBs are designated GBU-12 (500-pound class), GBU-16 (1,000-pound class), and GBU-10 (2,000-pound class). In response to an urgent USMC request for a through-the-weather, precision weapon the DoN awarded a contract for a Dual Mode Laser Guided Bomb kit to Lockheed Martin in November 2005. The resultant precision strike weapon will provide increased range, and allow delivery through adverse weather utilizing GPS/INS and Laser guidance systems.

Status
Approximately 19,000 Dual Mode Kits will be procured through the life of the program.

Developers
Raytheon; Tucson; Arizona
Lockheed Martin; Bethesda, Maryland

GBU-31/32/38 Joint Direct Attack Munition (JDAM)

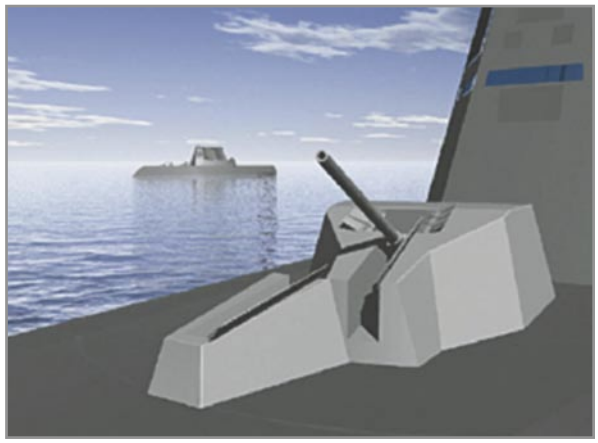
Description
The JDAM is a multi-service program, with the Air Force as the lead service, for a strap-on, Global Positioning System (GPS)-aided, Inertial Navigation System (INS) guidance kit to improve the accuracy of existing 500-pound, 1,000-pound, and 2,000-pound general-purpose and penetrator bombs (BLU-109) in all weather conditions. JDAM is a true force multiplier, allowing a single aircraft to attack multiple targets from a single release point, and has been proven in operations in Iraq, Kosovo, and Afghanistan.

Status
LRIP for the 2,000-pound kits began in FY 1997, and Milestone III was reached in FY 2001. The 1,000-pound JDAM kit reached IOC in FY 2002, and IOC for the 500-pound weapon occurred during the second quarter of FY 2005. Procurement of JDAM continues across the FYDP, with 19,420 kits programmed.

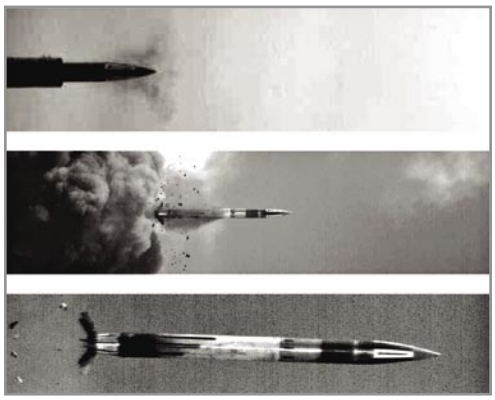
Developers
Boeing; St. Louis, Missouri

SUBSURFACE, SURFACE, AND EXPEDITIONARY

Advanced Gun System (AGS)



Description
The 155mm AGS is planned for installation in DD(X) (see separate program summary) to provide precision, volume, and sustained fires in support of distributed joint and coalition forces ashore. AGS is a fully integrated, automatic gun and magazine weapon system that will support the DD(X) Naval Surface Fire Support mission. Each system will be capable of independently firing up to 10 rounds per minute from a fully automated magazine. The AGS program includes development of the GPS-guided 155mm Long-Range Land-Attack Projectile (LRLAP), the first of a family of AGS munitions. AGS, fully integrated into DD(X), is designed to meet the reduced manning and radar-signature requirements of DD(X) ship program.



Status
The program started in FY 1999 and is an integral part of the DD(X) program. The first gun system is scheduled for delivery to support the first DD(X) fleet delivery in FY 2012.

Developers
BAE Systems; Minneapolis, Minnesota

Tactical Tomahawk Weapon Control System (TTWCS)

Description

TTWCS is the next significant upgrade to the current Advanced Tomahawk Weapon Control System (ATWCS). TTWCS introduces the ability for firing units to plan missions, retarget missiles to alternate pre-planned targets and monitor missiles in-flight. The upgraded system reduces the number of equipment racks required aboard surface ships, introduces common software for the various Tomahawk capable platforms (DDG, CG, SSN, SSGN, and U.K. SSN), reduces overall reaction and engagement planning time, improves operator interaction with the system, and provides an integrated training capability at all levels. Furthermore, TTWCS builds upon the ATWCS open system architecture to provide for future growth, eliminates stand-alone Tomahawk desktop computers, and enhances command-and-control interoperability. TTWCS also provides firing units the onboard ability to plan Global Positioning System (GPS) missions for both the Block III and Block IV Tomahawk Missiles and retarget in-flight missions to new GPS coordinates for the Block IV missile. TTWCS is fully compatible with all versions of the Tomahawk Land Attack Missile.

Status

The TTWCS Block III weapon control system capability reached IOC in 2003, allowing TTWCS to fire Block IV missiles. Full Block IV IOC occurred in 2004 with introduction of the Tactical Tomahawk missile. The USS *Stethem* (DDG 63) launched a Block III and several Block IV Tomahawk missiles using the new TTWCS Version 4, successfully testing Launch Platform Mission Planning (LPMP). LPMP enables individual ships and submarines to plan and execute Tomahawk cruise missile strikes with both the Block III and Tactical Tomahawks. TTWCS Version 5 continues to enhance the Tactical Tomahawk Weapon System capabilities and is expected to IOC in the Fall of 2006. SSGNs will also be outfitted with TTWCS with a scheduled IOC of 2007. TTWCS functionality is also currently planned for installation on the DD(X) combatant.

Developers

Lockheed Martin; Valley Forge, Pennsylvania
Naval Surface Warfare Center; Dahlgren, Virginia
Naval Undersea Warfare Center; Keyport, Washington
Southeastern Computers Consultants; Austin, Texas
Naval Undersea Warfare Center; Newport, Rhode Island

BGM-109/UGM-109 Tomahawk Land-Attack Missile (TLAM)

Description

The TLAM is the Navy's premier, all-weather, long-range, subsonic land-attack cruise missile deployed on surface warships and attack submarines. Block IV Tactical Tomahawk (TACTOM), BGM-109E/UGM-109E, an upgrade from the original TLAM Block III missile, preserves Tomahawk's long-range precision-strike capability while significantly increasing responsiveness and flexibility at significantly lower cost. TACTOM improvements include:

- **In-flight retargeting**
- **Ability to loiter over the battlefield and to respond to emergent targets**
- **Ability to monitor the health and status of the missile in flight via a satellite data link**
- **Battle Damage Indication Imagery capability that gives a digital look-down "snapshot" of the battlefield and sends it via satellite data link**
- **Global Positioning System (GPS) mission planning onboard the launch platform, enabling the shooter to plan and rapidly execute strike missions against emergent battlefield targets**
- **Improved anti-jam GPS that minimizes the susceptibility to jamming**
- **A missile design that allows for alternative payloads, including smart sub munitions, a penetrator warhead, and multiple response warhead**

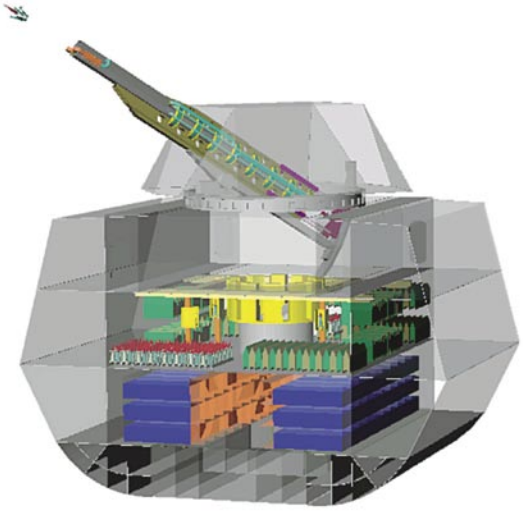
The TACTOM program began in FY 1998 and full IOC occurred in FY 2004. The Navy completed the first ground test of the TACTOM missile in 2002, vertically launching the missile, which flew a fully guided 550-mile flight using the GPS and digital scene matching area correlation navigation updates. Eight flight tests from both surface ships and attack submarines demonstrated all system capabilities. Current plans call for the Navy to procure more than 3,000 TACTOM missiles. Additional TACTOM procurement is constrained by fiscal priorities. TLAM Block III BGM-109 and UGM-109 missiles are still deployed in the Fleet. Block III TLAM Missiles undergo periodic recertification and maintenance to assure their continued viability.

Status

LRIP I and II are complete. Raytheon Missile Systems began missile deliveries in May 2004 and is currently delivering LRIP III missiles. The full-rate production contract signed on 18 August 2004 was the Navy's first multi-year contract for weapons procurement and will procure approximately 2,000 missiles. To date, more than 180 missiles have been delivered to the Fleet.

Developers

Raytheon Missile Systems; Tucson, Arizona



Electromagnetic Railgun

Description

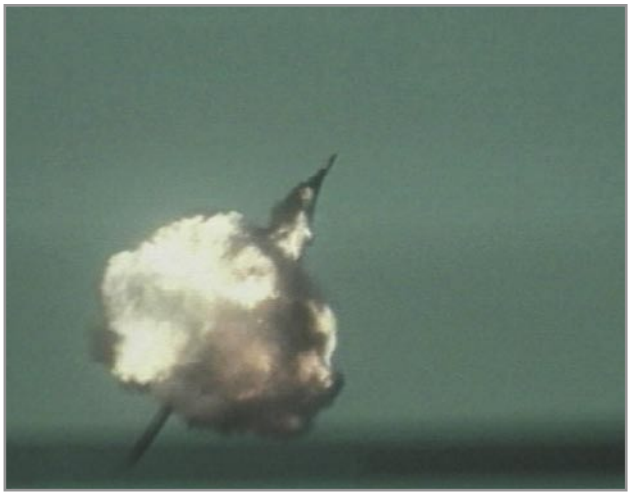
The Electromagnetic Railgun is a long range, direct/indirect fire weapon system that uses a hypersonic electromagnetic-launched guided projectile with kinetic energy lethality. It will provide long-range naval surface fires support (200-300nm), provide significantly shorter time-of-flight than current land-attack missile systems, and high-lethality (energy-on-target).

Status

A part of the Office of Naval Research Innovative Naval Prototype Program, the Railgun is being evaluated for naval applications using Science & Technology funding.

Developers

To be determined.



Extended-Range Munition (ERM)

Description

The ERM is a rocket-assisted projectile capable of carrying a Unitary blast-fragment warhead with an associated height-of-burst fuse. The 100 pound-plus aerodynamic projectile is five inches in diameter and 61 inches in length and uses a coupled Global Positioning System/Inertial Navigation System (GPS/INS) guidance system. The guidance system is resistant to jamming, enabling the ERM to attack targets in an electronic countermeasures environment. Its long range and accurate GPS targeting capability will improve Naval Surface Fire Support (NSFS) and provide gunfire support for expeditionary operations, suppression, and destruction of hostile anti-shipping weapons and air defense systems in support of the joint land battle.

Status

Milestone I/II was reached in July 1996, allowing the ERM to enter EDD. Developmental work continues as the program overcomes technical challenges. Work also continues on increasing lethality, designing the highly accurate guidance system that can withstand the harsh environment encountered during a gun firing, and other areas to provide cost-effective, accurate, and lethal munitions that meet NSFS requirements. Competition to award final phase of EDD will take place in the first quarter of FY 2006.

Developers

To be determined.

MK-45 Mod 4 Five-Inch/62-Caliber Gun System Upgrade

Description

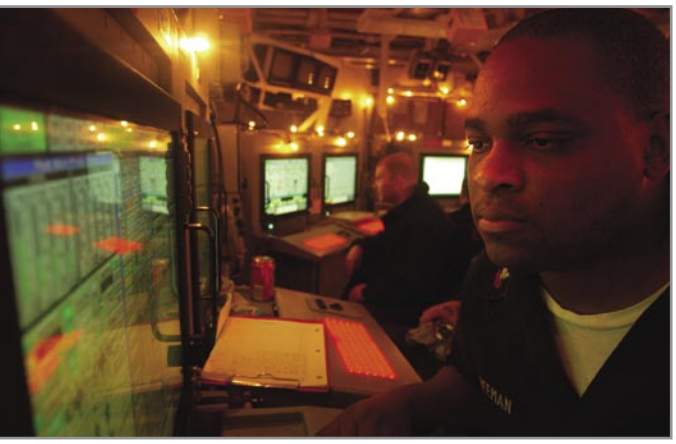
The MK-45 Mod 4 5-inch 62 Gun will significantly enhance Naval Surface Fire Support (NSFS) capabilities, significantly improve maintenance procedures, and provide fire mission flexibility for anti-surface and anti-air warfare. The 5-inch (127mm)/62-caliber MK-45 Mod 4 Gun incorporates structural improvements to accommodate higher energies required to fire Extended-Range Munitions (ERM) and the current inventory of conventional 5-inch ballistic ammunition. Modifications include a longer (62-caliber) barrel, an Ammunition Recognition System, a Gun/ERM interface and a digital control system. Modifications to the ammunition magazine for the MK-45 Mod 4 Gun have also been developed to facilitate stowage of the larger ERM rounds and assist shipboard ammunition handling personnel with handling and loading the heavier rounds. The MK-45 Mod 4 Gun is currently being forward-fit in *Arleigh Burke* (DDG 51)-class Aegis destroyers (DDGs 81-112).

Status

Milestone I/II was reached in January 1996, allowing the MK-45 Mod 4 Gun to enter EMD. The Navy awarded the MK-45 Mod 4 Gun design and development contract on 5 February 1996. Three MK-45 Mod 4 kits have been produced to facilitate development and testing. The first kit was installed in a proof of concept gun, which successfully completed testing in July 1997 at the Naval Surface Warfare Center, Dahlgren (NSWC/DD) Virginia. All critical exit criteria associated with land-based testing were met allowing for LRIP approval on 12 April 1999. The gun completed testing with conventional rounds in 2003 and was approved to fire conventional ammunition per 24 April 2004 Milestone C decision. The gun will be evaluated for ERM functionality in parallel with the ERM test schedule. There are currently 16 DDG 51 destroyers equipped with the MK-45 Mod 4 Gun. The program's procurement rate has been balanced within available resources.

Developers

BAE Systems (formerly United Defense Limited Partnership); Minneapolis, Minnesota



Naval Fires Control System (NFCS)

Description

The NFCS is the enabler for surface land-attack in network centric warfare operations. It automates shipboard land-attack battle-management duties, and communicates with the ground force's primary fire support command and control network, the Advanced Field Artillery Tactical Data System (AFATDS). NFCS will be interoperable with joint C4ISR systems, providing the mission-planning and fire-support coordination functions required to support expanded mission capability afforded by the extended range and precision accuracy of the improved MK-45 Mod 4 (5-inch/62-caliber) gun, Extended Range Munition (ERM), and the Advanced Gun System (AGS).

Status

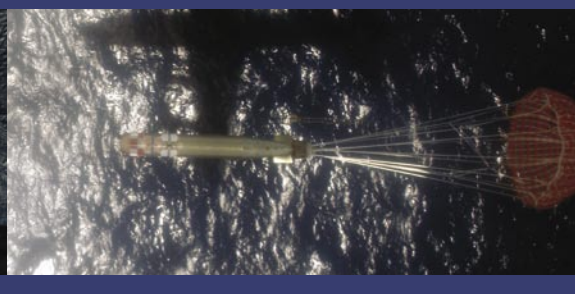
Milestone III was reached on 6 December 2004 which authorized full-rate production of NFCS with a limited fleet introduction. The system achieved IOC 5 July 2005. Program development and procurement is on track for installation on DDGs 81-112. A total of 32 systems are planned for fielding FY 2005-2011.

Developers

Naval Surface Warfare Center; Dahlgren, Virginia
Space and Naval Warfare Systems Center; San Diego, California

Naval Undersea Warfare Center; Keyport, Washington
General Dynamics Information Systems; Arlington, Virginia
GEC-Marconi Electronics Systems; Wayne, New Jersey





SEA SHIELD

PLATFORMS
AIRCRAFT

Broad Area Maritime Surveillance (BAMS) Unmanned Aircraft System (UAS)

Description

BAMS UAS is integral in recapitalizing the Navy's airborne ISR force. BAMS UAS will provide a persistent maritime ISR capability that will play a significant role in the Sea Shield and FORCEnet pillars of *Sea Power 21*. In its Sea Shield role, BAMS UAS's on-station persistence enables unmatched awareness of the maritime battlespace by sustaining the maritime Common Operational Picture for Surface Warfare and the Global War on Terrorism. The system will serve as a Fleet Response Plan enabler while acting as a trip wire for surge forces. In its FORCEnet role, it will support decision superiority precision and mobility while providing IP-based wideband transponder services that net the battlespace.

BAMS UAS is an endurance-class UAS that will operate from land-based sites around the world. Sites most likely will be located at current P-3 aircraft, or its planned successor, MMA, operating sites. Because BAMS UAS and the MMA/P-3 have related, complementary missions, co-location enhances manpower, training, and maintenance efficiencies. Systems of up to 5-6 air vehicles at each operating location provide persistence by being airborne 24 hours a day, 7 days a week out to on-station ranges of 2,000 nautical miles. Worldwide access is achieved by providing coverage over high-density sea-lanes, littorals, and areas of national interest from its operating locations.

Status

The BAMS UAS analysis of alternatives, operational requirements document, and initial CONOPS is complete. Milestone B is scheduled for the fourth quarter, FY 2007 and IOC is scheduled for FY 2013.

Developers

To be determined.

MH-60R/S Seahawk Multi-Mission Combat Helicopters

Description

The MH-60R and MH-60S multi-mission combat helicopters are the two pillars of the CNO's Naval Helicopter Concept of Operations (CONOPS) for the 21st Century. Under the Helicopter CONOPS, the Seahawk will deploy as companion squadrons embarked in the Navy's aircraft carriers, surface warships, and logistics ships. The MH-60R will provide surface and undersea warfare support to Sea Shield operations with a suite of sensors and weapons that include low frequency (dipping) sonar, electronic support measures, advanced Forward Looking Infrared, and precision air-to-surface missiles. The MH-60S will provide mine warfare support for Sea Shield and will partner with the MH-60R for surface warfare missions carrying the same Forward Looking Infrared air-to-ground sensors and weapons. The MH-60S will be reconfigurable to provide Combat Search and Rescue and Naval Special Warfare support to joint theater operations. Airborne mine countermeasures operations will be accomplished using advanced sensor and weapons packages to provide detection, localization, and neutralization to anti-access threats. The MH-60S will anchor the fleet logistics role in carrier strike group and expeditionary strike group operations. MH-60R/S platforms are produced with 85 percent common components (e.g., common cockpit and dynamic components) to simplify maintenance, logistics, and training.

Status

The MH-60R completed its Operational Evaluation in third quarter FY 2005. It is scheduled for a full-rate production decision in FY 2006. The Navy plans to acquire 254 MH-60Rs. The MH-60S was approved for full-rate production in August 2002 and is currently undergoing scheduled block upgrades for combat and airborne mine counter-measure missions. The Navy plans to acquire 271 MH-60Ss.

Developers

Lockheed Martin; Owego, New York
Sikorsky; Stratford, Connecticut

MQ-8B Fire Scout Vertical Takeoff and Landing Tactical UAV (VTUAV)

Description

Fire Scout VTUAV will provide multi-mission tactical UAS support to the Littoral Combat Ship (LCS). Fire Scout will support LCS core mission areas of Mine Interdiction Warfare (MIW), Antisubmarine Warfare (ASW), and Surface Warfare (SUW) with modular payloads as well as organic ISR, targeting, and communication-relay functions. The Fire Scout will employ the Tactical Control System (TCS) and the Tactical Common Data Link (TCDL) as the primary means for UAS command and control and

sensor payload dissemination. Fire Scout is a critical component of LCS off-board sensors.

Status
Fire Scout is currently in Engineering, Manufacturing, and Development (EMD) with developmental testing ongoing. Fire Scout is scheduled for IOC in FY 2008. Fire Scout has also been selected by the U.S. Army for its Future Combat Systems (FCS) Class IV Unmanned Aircraft System.

Developers
Northrop Grumman; San Diego, California
Schweizer Aircraft Corporation; Big Flats, New York

P-8A Multi-Mission Maritime Aircraft (MMA)

Description
The P-8A will replace the P-3C Orion aircraft, which has reached the end of its service life. The P-8A will feature a technologically agile, open architecture that enables integration of modern, capable sensors with robust communications. P-8A will tailor integration of its onboard mission suite with unmanned aerial vehicles and satellite-based systems and sensors to assure maritime access in support of the Sea Shield pillar of *Sea Power 21*. MMA will provide unparalleled persistent undersea warfare capability as well as significant anti-surface warfare and intelligence, surveillance, and reconnaissance (ISR) capability. MMA will leverage global logistics support infrastructure and established advanced training applications to provide both higher availability and improved warfighting readiness. Finally, MMA will implement a new Human Total Force Strategy that uses contractors to perform most of the maintenance functions presently performed by Sailors, thereby lowering operating and support costs below that of the legacy platform.

Status
The MMA program received a Milestone 0 decision in March 2000 and explored concepts for MMA with industry. Included in the concepts was the integration of UAVs to augment MMA capability. An Analysis of Alternatives (AoA) began in summer 2000 and leveraged previous analyses and the results of the industry studies. The AoA concluded that manned aircraft are an essential element of providing broad area maritime and littoral armed ISR, and that UAVs provided a transformational opportunity for obtaining additional capability for warfighters. In 2002, the Navy re-engaged industry in Component Advanced Development, refining concepts, matching architecture to fill the Navy vision and validating requirements. USD (AT&L) approved a revised acquisition strategy to focus MMA on P-3 replacement, not a P-3 Service Life Extension. The Operational Requirements Document/Concept Development Document was endorsed by the Navy staff and received the required certifications from the Joint staff in preparation for a 2004 Milestone B (entry into System Development and

Demonstration). That milestone was successfully passed in May 2004 and the Navy selected the McDonnell-Douglas Corporation, a wholly owned Subsidary of the Boeing Company, as the single system integrator in June 2004. The P-8A program completed a successful Preliminary Design Review in November 2005 and is currently working toward Critical Design Review planned for early 2007.

Developers
Boeing; Renton, Washington

P-3C Orion Modification, Improvement, and Sustainment

Description
The P-3C Orion provides effective undersea warfare, anti-surface warfare, and Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) capabilities to naval and joint commanders, including support for carrier strike groups and expeditionary strike groups. The current force is 12 active and three reserve squadrons. There are also three Reserve Fleet Response Units (FRUs) co-located with the active squadrons at Jacksonville, Florida; Brunswick, Maine and Whidbey Island, Washington. The FRUs operate current Fleet equipment and are trained to provide augmenting crews to the active force. The Navy's P-3 roadmap focuses on three areas: Inventory sustainment, modernization, and re-capitalization by the Multi-Mission Maritime Aircraft (MMA) to provide a force optimized for regional and littoral crisis and conflict.

Specific program elements include:

Inventory Sustainment: A service life assessment program has been completed to determine what actions must be taken to safely extend the airframe service life. A program of Special Structural Inspections (SSIs), which will allow extension of P-3 service life, started in FY 2003. More comprehensive inspections and preemptive repairs are being performed under the Enhanced Special Structural Inspection (ESSI) program that started in FY 2004. The Special Structural Inspection-Kit (SSI-K) program that starts in FY 2005 is similar to ESSI but has expanded scope and includes use of new design/materials to increase fail-safe margins. These programs will allow sustainment of the P-3 fleet until the MMA starts replacing the P-3 in 2013.

Modernization: The Anti-Surface Warfare Improvement Program (AIP) provides enhanced sensor, C4ISR, and weapon capabilities. The program includes the incorporation of improved C4I systems, an advanced imaging radar, an infrared/electro-optic sensor, an improved Electronic Support Measures (ESM) system, improved weapons capability, and enhanced survivability measures. AIP aircraft will be equipped with the USQ-78B acoustic processor for improved littoral ASW effectiveness.

The P-3C Update III Block Modification Upgrade Program (BMUP) converts P-3C Update II and II.5 aircraft to the Update III system architecture. BMUP aircraft are also equipped with the USQ-78B.

Status
Fifty-five SSIs are complete and 15 ESSIs are complete. Sixty-four of 68 funded AIP aircraft have been delivered (one has been struck). Eight of 25 BMUP kits have been delivered.

Developers
Lockheed Martin; Marietta, Georgia
Lockheed Martin; Eagan, Minnesota
Lockheed Martin; Greenville, South Carolina
Lockheed Martin; Manassas, Virginia
L3Com; Greenville, Texas

S-3B Viking Sustainment Program

Description
The S-3B Viking provides multi-mission support to battle group and joint commanders as the carrier strike group's primary anti-surface warfare platform. In addition, it provides electronic surveillance and overland strike support and will remain the sole organic aerial refueling asset until the full integration of the F-18E/F Super Hornet.

Status
The S-3B Viking community was selected for retirement in October 2002, which will be coordinated with the fielding of the F/A-18E/F Super Hornet tanker capable aircraft through FY 2009. All current avionics/navigation/computer upgrade programs required to safely sustain the aircraft through its projected retirement schedule have been completed. The majority of Viking pilots and naval flight officers will transition to other naval aviation communities as an integral part of the S-3B Sundown Plan.

Developers
Lockheed Martin; Fort Worth, Texas

SUBMARINES

SSN 774 Virginia-Class Nuclear-Powered Attack Submarine

Description
The *Virginia* (SSN 774)-class submarine will provide advanced acoustic technology and will perform traditional open-ocean anti-submarine and anti-surface missions, yet is specifically designed for multi-mission littoral and regional operations. These advanced submarines will be fully configured to conduct mining and mine reconnaissance, Special Operations Forces insertion/ extraction, battle group support, intelligence-collection and surveillance missions, sea-control, and land attack. Furthermore,

the *Virginia* SSNs will be specifically configured to adapt easily to special missions and emerging requirements.

The 30-ship SSN 774 program is the first major program to implement acquisition reform initiatives fully. The tenets of the *Virginia*-class affordability are Integrated Product and Process Development (IPPD), modular construction, parts reduction, and aggressive insertion of advanced COTS technologies and an open-architecture computing environment. The IPPD concept teams the Navy, shipbuilders, designers, and vendors to assure the most efficient and effective design early in the design process. Modular construction allows construction, assembly, and testing of systems prior to installation in the ship's hull, thereby reducing costs, minimizing rework, and simplifying system integration. The ship's modular design will also facilitate technology insertion in both new-construction future ships and back-fit into existing ships, throughout their 30-year service lives.

Status

The first seven ships are being built under an innovative teaming arrangement between General Dynamics Electric Boat (EB) and Northrop Grumman Newport News (NGNN). Under the teaming arrangement, construction of the ships will be shared by ship section. NGNN is building the bow, stern, sail, and selected forward sections for each submarine. EB is building the hull sections, the engine room modules, and the command-and-control system operating spaces. EB will assemble and deliver the first, third, and fifth ships; NGNN, the second, fourth, and sixth. Construction of the USS *Virginia* (SSN 774) began in FY 1998, and the ship was commissioned in October 2004. The *Virginia* conducted her first operational mission in 2005, prior to her Post Shakedown Availability dry-docking, an unprecedented achievement. *Virginia's* ability to successfully complete this early deployment is a testament to the excellent design and construction effort put forth by both EB and NGSS. USS *Texas* (SSN 775) began construction in FY 1999. USS *Hawaii* (SSN 776) began construction in FY 2001. USS *North Carolina* (SSN 777) began construction in FY 2002. USS *New Hampshire* (SSN 778) began construction in FY 2003. USS *New Mexico* (SSN 779) began construction in FY 2004 and SSN 780 and SSN 781 began construction in FY 2005 and FY 2006, respectively. *Virginia*-class acquisition continues throughout the FYDP. The FY 2007 request included funds for the fourth of five submarines ordered under an innovative multi-year procurement contract that resulted in a cost savings of approximately $80 million per hull or $400 million throughout the course of the contract

Developers

General Dynamics Electric Boat; Groton, Connecticut
Northrop Grumman; Newport News, Virginia

SURFACE AND EXPEDITIONARY WARFARE SHIPS AND CRAFT

CG 47 Ticonderoga-Class Aegis Guided-Missile Cruiser Modernization

Description

The 22 *Ticonderoga* (CG 47)-class guided missile cruisers have a combat system centered on the Aegis Weapon System and the SPY-1 A/B multi-function, phased-array radar. *Ticonderoga*-class cruisers provide multi-mission offensive and defensive capabilities, and operate independently or as part of Carrier Strike Groups, Expeditionary Strike Groups, and Surface Action Groups for global concepts of operation. The *Ticonderoga*-class combat system includes the Standard Missile (SM-2), unparalleled land-attack systems, advanced anti-submarine and anti-surface warfare systems, embarked sea-control helicopters, and robust command-control-and-communications systems in a potent, multi-mission warship. In addition, these cruisers are equipped with the MK-41 Vertical Launching System (VLS), giving them a significant surface fire capability with the Tomahawk Land-Attack cruise Missile (TLAM) and, in the future, the Tactical Tomahawk (TACTOM).

Status

The 22 VLS-capable Aegis cruisers are planned for Cruiser Modernization beginning in FY 2008, and will receive upgrades in air dominance (cooperative engagement capability, SPY radar upgrades), maritime force protection (CIWS 1B, ESSM, Nulka, SPQ 9B), undersea warfare (SQQ 89A(V)15) and mission life extension (SmartShip, all-electric auxiliaries, weight, and moment). The cruisers are viable candidates for a ballistic missile defense role. The Cruiser Modernization warfighting improvements will extend the Aegis combat system's capabilities against projected threats well into the 21st Century and, with the DDG 51 destroyers, serve as the bridge to the surface combatant family of ships: DD(X), LCS, and CG(X).

Developers

General Dynamics Bath Iron Works; Bath, Maine
Northrop Grumman Ship Systems; Pascagoula, Mississippi
Lockheed Martin; Moorestown, New Jersey

CG(X) 21st Century Cruiser

Description

The Next-Generation Guided Missile Cruiser, CG(X), is envisioned as a highly capable surface combatant tailored for Air and Missile Defense and Joint Air Control Operations. CG(X) will provide maritime dominance, independent command and control, forward presence and operate as an integral component of joint and combined forces. The CG(X) design and development program features evolutionary acquisition and spiral development practices to incorporate advanced technologies and next generation

engineering systems. CG(X) will also replace the Ticonderoga (CG 47)-class ship at the end of its 35 year service life. Current Navy campaign and joint missile defense analysis has demonstrated a critical mission need for CG(X) late next decade.

Status
The Navy anticipates the ICD for Maritime Defense of the Joint Force to be through Joint Staff review and receive JROC approval in early 2006. The subsequent AoA will determine CG(X)'s best mix of capabilities and tradeoffs between hull form, interceptors, air and missile defense systems, sensors, other combat systems, employment and costs.

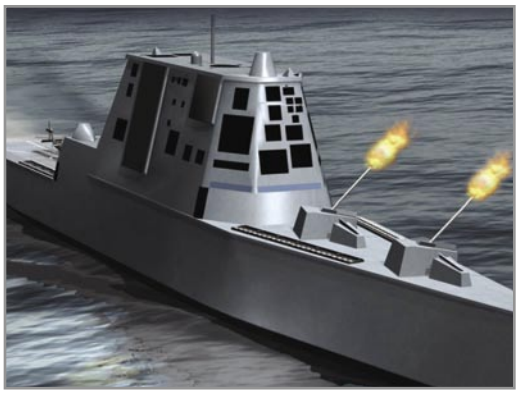
Developers
To be determined.

DDG 51 Arleigh Burke-Class Aegis Guided-Missile Destroyer

Description
The *Arleigh Burke* (DDG 51)-class guided missile destroyers are equipped with the Aegis Combat System which includes the SPY-1D multi-function, phased-array radar. The *Burke*-class combat system includes the MK-41 Vertical Launching System (VLS), an advanced Anti-Submarine Warfare (ASW) system, Standard Missile (SM-2), and Tomahawk land attack cruise missiles. Incorporating all-steel construction and gas-turbine propulsion, DDG 51 destroyers provide multi-mission offensive and defensive capabilities and can operate independently or as part of carrier strike groups, surface action groups, and expeditionary strike groups. The Flight IIA variants currently under construction incorporate facilities to support two embarked helicopters, significantly enhancing the ship's sea-control capabilities. These ships have the Aegis Weapons System Baseline 6 Phase 3 and Baseline 7, which incorporates Cooperative Engagement Capability (CE C) and Evolved Sea Sparrow Missile (ESSM) warfighting capabilities. The improved SPY-1D(V) radar and the Remote Mine-Hunting System(RMS) in DDGs 91-96 are just a few examples of capabilities being introduced as part of Baseline 7 Phase I, commencing with USS *Pinckney* (DDG 91). Together with the Cruiser Modernization program, these highly capable warships will be the bridge to the next-generation surface combatant family of ships: DD(X), LCS, and CG(X).

Status
Fifty-two *Arleigh Burke*-class destroyers have been delivered with a total of 62 to be delivered at the end of production. Two DDGs are scheduled for delivery in FY 2006. The purchase of the last three DDGs, to complete a ship class of 62, was completed in January 2005.

Developers
General Dynamics Bath Iron Works; Bath, Maine
Northrop Grumman Ship Systems; Pascagoula, Mississippi
Lockheed Martin; Moorestown, New Jersey



DD(X) 21st Century Destroyer

Description

The Navy has determined that multiple surface combatants are required to meet future warfighting requirements, not just a single ship class. DD(X) is the Navy's future multi-mission destroyer, designed to provide precision strike and sustained volume fires to support forces inland and conduct independent attacks against land targets. DD(X) will be armed with the Advanced Gun System (AGS), which fires precision-guided Long-Range Land-Attack Projectiles (LRLAP) up to 83 nautical miles. For longer-range strike missions, DD(X) will carry Tactical Tomahawks (TACTOM) housed in a damage-tolerant Peripheral Vertical Launch System (PVLS) lining the ship's hull. With state-of-the-art network-centric information technologies, DD(X) will operate seamlessly with naval, ground, and land-based forces. The DD(X) program's emphasis on "sensor-to-shooter" connectivity will provide a naval or Joint Task Force commander with the multi-mission flexibility to engage a wide variety of land targets while simultaneously defeating maritime threats. DD(X) capabilities in undersea, surface, and air warfare are designed for enhanced performance in the littoral environment, providing defense of other ships in the expeditionary strike group or carrier strike group. DD(X) will have a large hangar and flight deck that can support unmanned aerial vehicles as well as helicopters and the new MV-22 tiltrotor aircraft. DD(X) will utilize multi-spectral signature reduction to render it significantly less detectable to potential adversaries and more survivable than our legacy fleet.

DD(X) will feature an Integrated Power System (IPS) to provide power for advanced propulsion systems as well as high-powered combat systems and ship service loads. An open-architecture distributed combat system will support a "plug-and-fight" environment. Current elements of the DD(X) combat system include the modular and highly survivable PVLS, the AGS and the Dual Band Radar (DBR) suite, composed of the Multi-Function and Volume Search Radars. Other DD(X) features include an advanced hull form, optimal manning based on comprehensive human-systems integration and human-factors engineering studies, extensive automation, advanced apertures, and dramatic reductions across the entire spectrum of signatures (radar, acoustic, magnetic, and infrared). DD(X) will use a "spiral-design" review process, ensuring that each of these breakthrough technologies responds to future operational requirements. Once validated aboard DD(X), appropriate technologies will be incorporated into other members of the family of surface combatants, including the next-generation cruiser as well as future carriers and amphibious ships.

Status

DD(X) successfully completed Flag-level Critical Design Review (CDR) and all ten Engineering Development Models for new technologies have also passed CDR. The Navy proposed a Dual Lead Ship acquisition strategy allowing competing shipyards to build

lead ships simultaneously. The Navy has awarded bridge contracts to continue development of critical systems pending approval of the acquisition strategy.

Developers
Northrop Grumman Ship Systems; Pascagoula, Mississippi
Raytheon; Sudbury, Massachusetts
More than 80 companies nationwide, including Lockheed Martin, BAE Systems, and General Dynamics Bath Iron Works

FFG 7 Oliver Hazard Perry-Class Guided-Missile Frigate Modernization

Description
The *Oliver Hazard Perry* (FFG 7)-class guided-missile frigates are capable of operating as an integral part of a carrier strike group or surface action group. They are primarily used today to conduct maritime interception operations, presence missions and counter-drug operations. A total of 55 *Perry*-class ships were built-51 for the U.S. Navy and four for the Royal Australian Navy. Of the 51 ships built for the United States, 21 remain in active commissioned service and nine are in the Navy Reserve Force (NRF). The FFG modernization improvements will assist the class in reaching its 30-year expected service life.

Status
The 30-ship FFG class is undergoing a modernization package that commenced in FY 2003 with USS *Kauffman* (FFG 59). It corrects the most significant maintenance and obsolescence issues in order to maintain the ships through their full 30-year service lives. The FFG 7 modernization package includes replacement of four obsolete Ship Service Diesel Generators (SSDG) with COTS SSDG; obsolete evaporators with COTS Reverse Osmosis (RO) units; and existing boat davit with COTS Slewing Arm Davit (SLAD). Other major HM&E alterations include ventilation modifications, AMR #3 AFFF Sprinkling modifications, Self-Contained Breathing Apparatus (SCBA) installation, replacement of water-cooled 400 Hz converters with air cooled frequency converters. Combat Systems improvements include the installation of CIWS 1B and Nulka, which will be completed earlier than scheduled (both are expected to be completed by FY 2007). The modernization effort is scheduled for completion by 2011.

Developers
General Dynamics Bath Iron Works; Bath, Maine

Littoral Combat Ship (LCS)

Description

Future joint and combined operations will hinge on our ability to provide access in the face of an unpredictable and asymmetrical threat. This has been recognized for some time; however, the events of the last few years, including the Global War on Terrorism, have brought a renewed sense of urgency to these misions. The anti-access threats challenging our naval forces in the littorals include quiet diesel submarines, mines, and small highly maneuverable surface attack craft. Such threats have great potential to be effectively employed by many less-capable countries and non-state actors to prevent U.S. forces from unhindered use of littoral areas. LCS, as one element of the future "surface combatant family of ships," will be optimized to defeat these anti-access threats in the littoral. It will use open-systems architecture design, modular weapons and sensor systems, and a variety of manned and unmanned vehicles to expand the battle space and project offensive power into the littoral.

Technology has matured to the point where we can employ significant warfighting capability from a small, focused-mission warship like the LCS in support of Sea Strike and Sea Shield operations. Focused-mission LCS mission packages are being developed that will provide capabilities critical to Sea Shield's forcible entry, sea/littoral superiority, and homeland defense missions. The ship will also possess inherent capabilities to conduct missions supporting intelligence, surveillance, reconnaissance, special operations, and maritime interception and homeland defense, regardless of mission package installed. Fully self-deployable and capable of sustained underway operations from homeports to any part of the world, the LCS will have the speed, endurance, and underway replenishment capabilities to transit and operate independently or with Carrier Strike or Expeditionary Strike Groups.

Status

LCS will capitalize on emerging unmanned vehicle, sensor and weapons technologies and will deliver the focused Sea Shield missions of Mine Warfare, Surface Warfare, and Anti Submarine Warfare. Initial program included 4 Flight 0 ships through FY 2007 with a notional Flight 1 to begin in FY 2008. Flight 0 has recently been expanded to include all ships through FY 2009. In May 2004, Navy awarded two contracts options to Lockheed Martin and General Dynamics to build four LCS Ships (2 of each design). USS *Freedom* (LCS 1), the first Lockheed Martin ship, is under construction in Marinette Marine (WI) with expected completion in February 2007. Final Design is complete for the General Dynamics ship (not yet named) and the option for detailed design and construction was exercised in October 2005 with construction underway at AUSTAL in Mobile Alabama. The Mine Warfare mission package will deliver in FY 2007 with Anti-submarine Warfare and Surface Warfare packages delivering in FY 2008.

Developers

Flight 0 teams led by General Dynamics and Lockheed Martin

MCM-1 Avenger-Class Mine Countermeasures Ship Modernization

Description

The *Avenger* (MCM-1)-class mine countermeasures ships are primarily used to detect, classify, neutralize, and sweep mines in integral waterways. These ships are one part of the mine warfare "triad". A total of 14 *Avenger*-class ships were built. Of the 14 ships built, nine remain in active service, and five are in the Naval Reserve Fleet (NRF). Upon d commissioning of the ten MHC-51 Osprey-class Coastal Mine Hunters, the five NRF ships will be placed back into active service. The MCM modernization improvements will assist the class in reaching its 30-year expected service life.

Status

The 14-ship MCM class is undergoing a modernization package that commenced in FY 2004. It corrects the most significant maintenance and obsolescence issues in order to maintain the ships through their full 30-year service lives. The MCM-1 modernization package includes Planned Product Improvement Program (PPIP) on the Isotta Fraschini main engines and generators for MCM-3 through MCM-14; replacement of the obsolete Mine Neutralization Vehicle with COTS Expendable Mine Neutralization System (EMNS); and upgrading the existing SQQ-32 Sonar with High Frequency Wide Band capabilities. Other major HM&E alterations include 400-Hz modifications, replacement of Aft Deck hydraulic equipment with electric equipment, replacement of the diesel generator analog voltage regulators with digital voltage regulators, and upgrading the common navigation system. The modernization effort is scheduled for completion by 2010.

Developers

To be determined.

WEAPONS

AIRBORNE

Airborne Mine Neutralization System (AMNS)

Description

The AMNS is an expendable, remotely operated mine neutralization device that leverages NDI and COTS technologies, deploys from MH-60S helicopters, and provides identification and neutralization of proud (i.e., not buried), close-tethered, and in-volume naval mines. The MH-60S will deploy a remotely operated AMNS neutralization device to a previously detected mine location where it will reacquire and neutralize identified targets. The AMNS will be fully integrated into the MH-60S avionics architecture.

Status
Beginning in FY 2003, AMNS systems have been procured for the MH-53E to provide a near-term fleet-interim airborne neutralization capability. Follow-on AMNS system integration into the MH-60S began in FY 2003 and will continue through a FY 2007 Milestone C decision. The Navy projects a FY 2009 IOC for the AMNS on the MH-60S.

Developers
Lockheed Martin; Syracuse, New York
STN Atlas; Germany

Rapid Airborne Mine Clearance System (RAMICS)

Description
The RAMICS will fire a special 30mm supercavitating projectile from a Bushmaster II gun to neutralize surface and near-surface mines. The RAMICS system will ultimately be hosted onboard the MH-60S helicopter as one of five developing Airborne MCM (AMCM) weapon systems organic to the Strike Group.

At the heart of this system is a supercavitating Tungsten projectile that is specially designed for traveling tactical distances in air and water and through a casing, causing a low-order deflagration of the mine. The gun is controlled by a fire-control system with targeting algorithms coupled with a Light Detection and Ranging (LIDAR) system. The LIDAR locates and targets the mines and provides aiming coordinates to the gun's fire control system to fire a burst of rounds at the mine, causing immediate and positive mine neutralization.

Status
The RAMICS program is re-baselined in FY 2006. Procurement of systems begins in FY 2009 with first installments in FY 2010. RAMICS IOC is scheduled for FY 2010.

Developers
Northrop Grumman; Melbourne, Florida

SUBSURFACE, SURFACE, AND EXPEDITIONARY

Assault Breaching Systems (ABS)

Description
The ABS program focuses on development of standoff weapons systems to counter mine and obstacle threats in the surf and beach zones. The program uses a "System of Systems" approach that includes development and fielding of Counter Mine Counter Obstacle (CMCO) kill mechanisms; Intelligence, Surveillance, Reconnaissance, and Targeting (ISR/T); Precision Craft Navigation; Lane Marking; and C4I capabilities. Near-term capability is scheduled to be fielded in FY 2007 with a far-term capability by FY 2016 (IOC). Potential platforms for employ-

ment of the breaching (kill) mechanisms may include naval strike aircraft and Air Force combat aircraft.

Status
The program is funded. Coastal Battlefield Reconnaissance and Analysis, the ABS ISR/T system, achieved Milestone B for its Block I capability in FY 2006. JDAM Assault Breaching System (JABS) will be introduced as initial CMCO capability in FY 2007.

Developers
Northrop Grumman

Aerial Targets

Description
The Navy Aerial Target Program assesses foreign threats, develops targets to represent the threats, and procures targets for fleet training and weapon system test and evaluation. The current inventory includes drones that represent the following types of threats: high-altitude supersonic diving missiles (AQM-37), aircraft (QF-4), subsonic sea-skimming anti-ship cruise missiles (BQM-34/74), and supersonic sea-skimming cruise missiles (GQM-163A, MA-31). New efforts within the program include the development and procurement of a next-generation Supersonic Sea-Skimming Target (SSST), the GQM-163 Coyote, designed to validate fleet readiness and weapon system effectiveness against a family of supersonic anti-ship cruise missiles. In addition, the Navy is conducting a pre-planned product improvement on the primary subsonic aerial target, the BQM-74E. The follow-on to the BQM-74E, the BQM-74F will be a faster, more maneuverable subsonic aerial target with increased range and endurance to challenge weapons systems and better train sailors.

Status
The GQM-163A developmental efforts were completed in May 2005 with first delivery of Low Rate Production assets occurring in the third quarter 2005. A total of 20 production assets are currently on contract with an additional award of 19 planned for FY 2006. The GQM-163A serves as a replacement for the Vandal (MQM-8G). Forty-one MA-31 SSST targets are also on contract. Currently, integration efforts with F-16 and MA-31 are on-going and will be completed in the second quarter FY 2006. MA-31 targets will provide the Navy with a power dive capability. BQM-74F targets are planned to enter the fleet in FY 2008. The Navy is also incorporating autonomous pre-planned flight profiles for the BQM-74, which would reduce the need for target control stations and enable the target to fly in areas where target control is not available. The Navy has discontinued its QF-4 program and now conducts test and evaluation events with Navy crews on Air Force ranges against QF-4s procured from the Air Force. Also, the Navy and Air Force are in the early stages of forming a team to develop a follow on full scale target to replace the aged QF-4. The Navy is initiating pre-acquisition activities for the Threat D Program in

FY 2006 with a planned contract award in first quarter FY 2007. Threat D target program will represent a two-stage (subsonic to supersonic) threat and will be used to support operational testing of several Navy programs including Standard Missile (SM-6), Aegis, SSDS, and other systems.

Developers
BQM-74 E/F: Northrop Grumman; Rancho Bernardo, California
GQM-163A: Orbital Sciences; Chandler, Arizona
MA-31: Boeing; St. Louis, Missouri

Lightweight Hybrid Torpedo (LHT)

Description
The MK-54 LHT is a modular upgrade to the lightweight torpedo inventory and is designed to counter quiet diesel-electric submarines operating in the shallow water littoral environment. LHT combines existing torpedo hardware and software from the MK-46, MK-50, and MK-48 Advanced Capability (ADCAP) programs with advanced digital COTS electronics. The resulting MK-54 LHT offers significantly improved shallow water counter-countermeasures capability at reduced life-cycle costs. While the baseline MK-54 will provide the warfighter with improved shallow water performance, the MK-54 P3I program will modernize the MK-54 by taking continuous advantage of technology advancements during the hardware acquisition process while addressing current weapon limitations and evolving threats and countermeasures. The MK-54 modernization plan will leverage the spiral acquisition process to synergistically introduce new hardware and software updates that will provide step-like increases in probability of kill while reducing life-cycle cost and allowing the torpedo to remain ahead of the evolving littoral submarine threat.

Status
MS II was achieved in FY 1996 along with an EMD contract award. A successful CDR was held in November 1999 with developmental testing beginning in July 1999. The LRIP contract was awarded in early FY 2000. The MK-54 Program completed OPEVAL in third quarter FY 2004, and achieved IOC in fourth quarter FY 2004. Procurement will include 128 LHTs in FY 2006, and approximately 1,500 for the total program. The torpedoes will be procured in economic order quantities from FY 2007 through FY 2011 to achieve a full operational capability in FY 2011.

Developers
Raytheon; Mukilteo, Washington

MK-15 Phalanx Close-In Weapon System (CIWS)

Description

The MK-15 CIWS is a radar-controlled, rapid-fire gun capable of firing 4,500 rounds per minute. An integral element of ship self-defense and the anti-air warfare, defense-in-depth concept, CIWS provides terminal defense against Anti-Ship Cruise Missiles (ASCMs) and high-speed aircraft penetrating outer fleet defensive envelopes. Additionally, CIWS Block 1B Surface Mode provides defense against small, fast, surface craft and slow-flying helicopters and aircraft. Other Block 1B improvements include better sensor support for close-in engagements [Forward Looking Infra Red/Video Tracker/Enhanced Radar (Ku Band)], the Enhanced Lethality Cartridge, and Optimized Gun Barrels. Existing CIWS mounts (Block 1 Baseline 0 through 2 and Block 1A) are being upgraded to CIWS Block 1B, outfitting all deploying ships by FY 2010 and completing installation by FY 2012. CIWS 1B upgrades and new production are programmed for aircraft carriers, cruisers, destroyers, frigates, and amphibious warships (LHD, LHA, and LPD) classes.

Status

More than 400 CIWS systems have been deployed at sea on U.S. warships since the system was first tested in August 1973. Development and Operational Testing of the fire-control system was completed in FY 1996, using the Self-Defense Test Ship. Testing of the Phalanx Surface Mode capability was completed in FY 1998, again using the Self-Defense Test Ship, and initial delivery was made in FY 2000. Acquisition continues in sufficient numbers to support new-construction warship delivery. In FY 2005 22 CIWS 1Bs were procured with 169 scheduled across the FYDP (FY 2006-2011).

Developers

Raytheon; Tucson, Arizona

MK-48 Advanced Capability (ADCAP) Torpedo

Description

MK-48 heavyweight torpedoes are used solely by submarines and are employed as the primary ASW and ASUW weapon in attack submarines and as the principal defensive weapon in strategic ballistic-missile submarines. Additionally, three allied countries have acquired the MK-48 torpedo. With a need to continue torpedo performance-upgrade programs to counter continuously evolving threats, the Navy developed the MK-48 ADCAP torpedo.

MK-48 ADCAP: The MK-48 Mod 5 ADCAP torpedo is the replacement for the MK-48 Mod 4 torpedo. Authorized for full production in 1990, the ADCAP counters surface-ship and submarine threats with greater speed and accuracy than any other submarine launched torpedo in the Navy's history. It is a heavyweight acoustic-homing torpedo with sophisticated sonar, all-digital guidance and control systems, digital fusing systems, and propul-

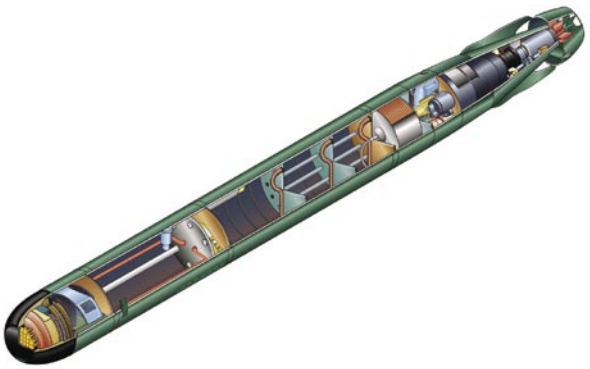
sion improvements. Its digital-guidance system allows for repeated improvements to counter evolving threats through software upgrades. The last new ADCAP torpedo was delivered in 1996. To improve future performance, several upgrades are being made to the existing ADCAP inventory.

ADCAP Modification Program (MODS): The MODS program implements significant software and hardware improvements to the existing ADCAP inventory to improve ADCAP operational capability in the next torpedo generation.

MK-48 Mod 6 ADCAP: The MK 48 Mod 6 gains two significant improvents over the Mod 5 following MODS program upgrade, one in guidance and control (G&C Mod), and the other in the torpedo propulsion unit (TPU Mod). The G&C Mod improves the acoustic receiver, replaces the guidance-and control set with updated technology, increases memory, and improves processor throughput to handle the expanded software demands required to improve torpedo performance against evolving threats. The TPU Mod provides a tactically significant reduction in torpedo radiated-noise signatures.

MK 48 Mod 7 Common Broadband Advanced Sonar System (CBASS): CBASS is a significant hardware and software upgrade to the MK-48 Mod 6 torpedo. The CBASS program is a joint development program with the Royal Australian Navy. It will include a new broadband sonar system (and its associated software) to achieve significant increases in operating bandwidth. The system will also include new broadband processing algorithms that will improve CCM and shallow-water performance while retaining deep-water performance characteristics. With the standup of a Royal Australian Navy MK-48 ADCAP intermediate maintenance capability in Australia, both Navies will be ready for joint operational testing to be conducted in waters off Australia. The first CBASS in water runs were conducted in September 2004 and the MK-48 Mod 7 CBASS torpedo is on schedule for IOC in FY 2006. The MK-48 ADCAP is and will remain the Navy's primary submarine launched conventional Anti-Submarine Warfare and Anti-Surface Warfare torpedo through 2026.

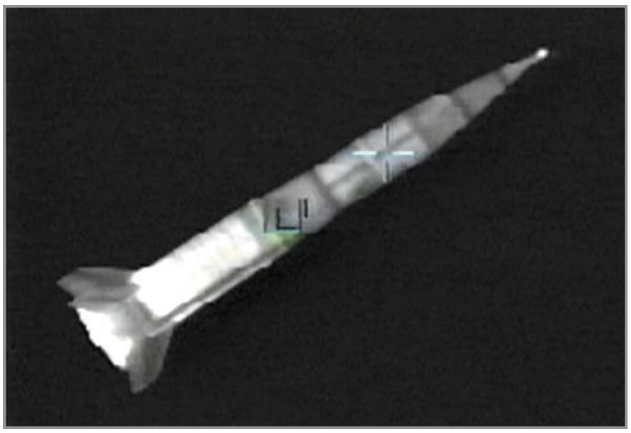
Operational Software Upgrades: Software upgrades have been and will be developed and integrated into the MK-48 ADCAP. Changes in threat scenarios, such as the inclusion of littoral operating areas, the increased availability of modern countermeasures, and the proliferation of diesel submarines, are the major impetus for updating software. Performance issues, including deficiencies discovered during fleet exercises and developmental testing, also will be resolved during these updates. The MK-48 ADCAP Torpedo Spiral Development program involves improving torpedo performance through software upgrades primarily against the shallow water diesel threat. Spiral 1 is expected to provide a 25 percent increase in torpedo effectiveness against targets in shallow water.



Status
The first phase of Spiral 1 has been completed and released for fleet use. Full Spiral 1 developmental and operational testing (DT/OT) will be completed in FY 2006. Spiral 2 and 3 development is in progress with DT/OT expected in FY 2008. Spiral 4 is planned for FY 2010. The MK-48 ADCAP Mod 6 ACOT completed DT in November 2004 and completed OT in November 2005 with fleet release expected in 2006. The MK-48 ADCAP Mod 7 (CBASS) is in OT with IOC scheduled for FY 2006. A total of 1,263 units are slated for conversion through the life of the program.

Developers
Raytheon; Keyport, Washington

Navy Ballistic Missile Defense (BMD)



Description
Aegis BMD includes modifications to the Aegis Weapon System and the development and upgrade of the Standard Missile 3 (SM-3) with its hit-to-kill kinetic warhead. This combination gives select Aegis cruisers and destroyers the capability to intercept short and medium-range ballistic missiles in the ascent, midcourse, and descent phases of their exo-atmospheric trajectories. Additionally, Aegis BMD provides surveillance and tracking capability against long-range ballistic missiles. Together, these capabilities provide robust defense-in-depth to U.S. and allied forces, vital political and military assets, population centers, and large geographic regions against the threat of ballistic missile attack. The Missile Defense Agency and the Navy fielded the Aegis BMD long-range surveillance and tracking capability as an element of the Ballistic Missile Defense System (BMDS) in October 2004. A short and medium range ballistic missile emergency engagement capability was fielded in 2005. The Aegis BMD Program Office continues a two-pronged engineering development effort of supporting SM-3 test flights and participating in risk-reduction activities.

Status
In October 2004 USS *Curtis Wilbur* (DDG 54) successfully conducted the initial at-sea shakedown of the Aegis BMD Long Range Surveillance and Tracking (LRS&T) capability, with outstanding results. Today, ten destroyers have the LRS&T capability, and are able to cue the greater BMDS. Additionally, two Aegis cruisers have both the LRS&T and an engagement capability. These ships are available to conduct emergency active defense against short and medium-range ballistic missiles and to cue the BMDS in defense of the homeland. A third cruiser is planned to have this capability in early CY 2006. The Navy and the Aegis BMD Program Office continue to develop the sea-based engagement capability. In February 2005, an SM-3 fired from the USS *Lake Erie* (CG 70) successfully intercepted a unitary (non-separating) ballistic missile target outside the earth's atmosphere. In November 2005, Lake Erie conducted the first successful intercept of a separating target. These were the fifth and sixth successful intercepts since January 2002. In

addition to successful engagement operations, Aegis BMD ships completed the first ever tracking of a live-ICBM class target by an LRS&T DDG in 2005. By demonstrating the ability to track long-range ballistic missiles, and with aggressive plans in place to continue demonstration of a sea-based engagement capability, the Aegis fleet has paved the way for the Navy to play a significant role in the nation's BMDS. By late 2005, Navy and MDA made significant progress in cooperative efforts to transition the ABMD Block 04 capability to the Navy and to merge future plans for Open Architecture combat systems. In addition to planning for a long-term solution to Sea Based Terminal BMD, Navy continues to plan for execution of the Near Term Sea Based Terminal (NTSBT) demonstration, an engagement of a Short Range Ballistic Missile (SRBM) using a modified Linebacker computer program and a modified SM-2 Block IV missile, in mid-CY 2006.

Developers
Lockheed Martin; Moorestown, New Jeresey
Raytheon; Tucson, Arizona

Naval Mines Quickstrike Mines

Description
The current Quickstrike family of aircraft-delivered bottom mines is being enhanced significantly by procurement of the programmable Target Detection Device (TDD) MK-71. Engineering development efforts include new advanced algorithms for ship detection, classification, and localization against likely threats, including quiet diesel-electric submarines, mini-subs, fast patrol boats, and air-cushioned vehicles

Status
Limited in-service support continues for current inventories and funding is in place for algorithm development and procurement of the TDD MK-71.

Developers
SECHAN Electronics, Inc.; Lititz, Pennsylvania

RIM-7, RIM-162 NATO Sea Sparrow Missile System (NSSMS) and RIM-162 Evolved Sea Sparrow Missile (ESSM)

Description
The MK-57 NSSMS is deployed on more than 50 Navy ships (CVN, LHD, LHA, DD, AOE classes) and numerous NATO ships as their primary surface-to-air ship self-defense missile system. Modifications to the Sea Sparrow continue, including the re-architecture combat system upgrade for CVNs, which reduces maintenance and manpower requirements, increases firepower, integrates the ESSM, and reduces cost of ownership through the use of COTS components. ESSM is the next generation of Sea Sparrow missiles, selected for the *Arleigh Burke* (DDG 51) Flight IIA Aegis destroyer self-defense systems as well as for Aegis cruisers receiving

Cruiser Modernization and aircraft carriers. ESSM is a kinematic upgrade to the improved RIM-7P missile. The upgrades consist of a more powerful rocket motor, a tail control section for increased responsiveness, VLS capability, upgraded warhead, and a quick-strike electronic upgrade. Enhanced ESSM kinematics and warhead lethality will leverage the robust RIM-7P guidance capability to provide increased operational effectiveness against high-speed maneuvering anti-ship cruise missiles at greater intercept ranges than is now possible with the RIM-7P. ESSM will be incorporated into the Aegis Baseline 6 Phase III and Baseline 7 Weapon Systems for short to medium-range missile defense. Additionally, the MK-29 trainable guided missile launcher will be modified to fire ESSM on CVNs. ESSM development is being pursued as an international cooperative initiative involving ten countries in the NATO Sea Sparrow Consortium.

Status

In-service support of NATO Sea Sparrow systems is complete. A memorandum of understanding was signed in June 1995 and 10 countries signed a production memorandum of understanding for ESSM in December 1997. ESSM successfully completed operational evaluation testing in mid-2003 and reached Milestone III and achieved full-rate production in January 2004. IOC occurred in FY 2004 with fleet introduction on an Arleigh Burke Flight IIA destroyer.

Developers

Raytheon; Tucson, Arizona

RIM-66C SM-2 Standard Missile-2 Blocks III/IIIA/IIIB

Description

Standard Missile-2 (SM-2) is the Navy's primary area air defense weapon. Deployed SM-2 Block III/IIIA/IIIB configurations are all-weather, ship-launched, medium-range surface-to-air missiles currently in service with the U.S. Navy and seven allies. SM-2 provides a robust area air defense layer required for maintaining forward naval presence, operating in the littorals, and projecting and sustaining U.S. forces in distant anti-access or area-denial environments. SM-2 Block III/IIIA/IIIB missiles are launched from the MK-41 Vertical Launching System (VLS) installed in Aegis cruisers (CG 52-73) and all Aegis guided-missile destroyers. It employs inertial mid-course guidance with command updates from the shipboard fire control system and an Electronic Countermeasure (ECM)-resistant mono pulse receiver for semi-active radar terminal homing. Each SM-2 block upgrade is progressively more capable and continues to evolve to provide enhancements in very high and very low altitude intercepts, stressing ECM environments, and against low altitude, supersonic maneuvering threats.

Block III features improved performance against low-altitude threats and optimizes the trajectory shaping resident within command guidance from the Aegis weapons system by implementing

Trajectory Shaping and Fuse Altimeter engineering change improvements. Block IIIA features significantly enhanced performance and lethality against sea-skimming threats due to a new directional warhead and Moving Target Indicator (MTI) fuse design in addition to enhanced trajectory-shaping functionality. Block IIIB builds on the Block IIIA improvements by adding an infrared (IR) guidance mode capability developed in the Missile Homing Improvement Program (MHIP) to improve performance in a stressing ECM environment. The IIIB MHIP dual-mode RF/IR guidance capability is being incorporated to counter a specific fielded and proliferating electronic warfare system in existing aircraft and cruise missile threats. Blocks IIIA/IIIB will be the heart of the SM-2 inventory for the next 15 years. The latest generation of Block IIIB missiles includes a maneuverability upgrade (SM-2 Block IIIB w/MU) to enhance IIIB performance against low-altitude, supersonic maneuvering threats.

Status

SM-2 Block III/IIIA/IIIB missiles are currently deployed. Block IIIB is the only variant in production for the U.S. Navy, although Block IIIA is still produced for Foreign Military Sales. Block IIIBs are being produced as new all-up rounds (AURs) and as upgrades from older Block III and IIIA missiles through the Service Life Extension Program (SLEP). FY 1995 was the first year of production for the SM-2 Block IIIB, which achieved IOC in FY 1997. The Block IIIB Maneuverability Upgrade went into production in FY 2004. The procurement objective is 1,500 Block IIIB AURs and 1,100 upgrades, scheduled to end in FY 2015.

Developers

Raytheon; Tucson, Arizona

RIM-116A Rolling Airframe Missile (RAM)

Description

RAM is a high-firepower, low-cost system designed to engage antiship cruise missiles (ASCMs) in the stressing electronic countermeasures (ECM) littoral conflict environment. RAM is a five-inch diameter surface-to-air missile with passive dual-mode radiofrequency/infrared (RF/IR) guidance and an active-optical proximity and contact fuse. RAM has minimal shipboard control systems and does not require shipboard information after launch. Effective against a wide spectrum of existing threats, the RAM Block 1 IR upgrade incorporates IR "all-the-way-homing" to improve performance against evolving passive and active ASCMs. Current plans are for RAM to continue evolving to keep pace with emerging threats.

Status

RAM is installed in *Tarawa* (LHA-1)-class amphibious assault ships; seven *Wasp* (LHD 1)-class amphibious assault ships; eight *Whidbey Island* (LSD 41)-class dock landing ships; four *Harpers Ferry* (LSD 49)-class dock landing ships, and seven aircraft

carriers; RAM is also planned for installation on all remaining aircraft carriers by FY 2007 as well as for all *San Antonio* (LPD 17)-class landing platform dock ships and flight 0 LCS. Block 0 missiles and launchers completed their final production run on schedule, and the missile has had successful intercepts in 177 of 186 production-acceptance and ship-qualification tests. The Block 1 missile has completed the most stressing OPEVAL ever attempted using the Self-Defense Test Ship-23 of 24 successful firings-and has completed Developmental/Operational Testing, with IOC in FY 2000. Block 1 is currently at full-rate production. So far the program has procured 90 missiles in FY 2002, 106 in FY 2003, 90 in FY 2004, 90 in FY 2005, and an additional 540 programmed from FY 2006-2011.

Developers
Raytheon; Tucson, Arizona
RAMSYS; Germany

SM-6 Extended-Range Active Missile (ERAM) Block I/II

Description
The Navy's next-generation Extended Range Anti-Air Warfare(ER AAW) interceptor, SM-6 is a transformational surface-to-air missile. With its active-seeker technology, SM-6 will meet the anticipated theater air and missile warfare threat well into the next decade, providing an essential element of the Navy's Sea Shield vision. Introduction of active-seeker technology to AAW in the Surface Navy reduces Aegis Weapon System reliance on illuminators and provides improved performance against stream raids and targets employing advanced characteristics (maneuverability, low radar cross section, kinematics, and advanced electronic countermeasure features). SM-6 is a critical pillar of the Navy's Integrated Fire Control-Counter Air (NIFC-CA) capability and will provide a significant contribution to the Joint Integrated Fire Control operational architecture. The evolutionary acquisition strategy will leverage alignment of technology paths among Naval Sea Systems Command (NAVSEA), Naval Air Systems Command (NAVAIR), and the Air Force across multiple missions and missile production lines to dramatically reduce technology development, recurring production, and life cycle costs. The SM-6 ERAM acquisition strategy is characterized as a low-risk development approach which leverages the SM-2 Block IV/IVA program Non-Developmental Items and Raytheon's Advanced Medium Range Air-to-Air Missile (AMRAAM) Phase 3 active seeker program for NAVAIR. The SM-6 need is documented in the Mission Needs Statement for Joint Theater Air and Missile Defense, Theater Air and Missile Defense Capstone Requirements Document (CRD), and in the Ship Class Anti-Air Warfare Self-Defense CRD. The specific requirements are documented in the Operational Requirements Document for Standard Missile-6 (SM-6) "TALON" ERAM, signed by the CNO on 1 May 2004. The SM-6 missile will be fielded on legacy DDG 51 and CG 47 class ships as well as the future CG(X) warship.

Status
Navy established the SM-6 ER AAW program in PB 2004, with an FY 2010 IOC. The Joint Requirements Oversight Council (JROC) approved the Operational Requirements Document 23 June 2004 following a Milestone B Defense Acquisition Board decision 15 June 2004 designating SM-6 an ACAT 1D program. SM-6 completed preliminary design review in FY 2005 and transitions to detailed designing FY 2006 well ahead of schedule. Spiral development for Block II will achieve full Joint Integrated Fire Control engagement operations and could include expanded capabilities to support sea-based terminal ballistic missile defense.

Developers
Raytheon; Tucson, Arizona

UGM-133A Trident II/D5
Submarine-Launched Ballistic Missile (SLBM)

Description
The Trident II/D5 is the sixth generation of the Navy's Fleet Ballistic Missile (FBM) program, which started in 1955. The D5 is a three-stage, solid propellant, inertial-guided submarine-launched ballistic missile (SLBM) with a range greater than 4,000 nautical miles and accuracy measured in hundreds of feet. The first eight *Ohio*-class submarines were configured to carry 24 Trident I/C4 missiles SLBMs. The ninth ship, the USS *Tennessee* (SSBN 734) and all later ships were armed with the Trident II/D5 missile system. Conversion of four of the C4 ships to carry the Trident II/D5 missile began in FY 2000 and will be completed in FY 2008. Trident missiles are capable of carrying W76 or W88 Multiple Independently Targeted Reentry Vehicles (MIRVs). In operation, Trident II/D5 missiles have been declared at eight MIRV warheads while Pacific Fleet Trident I/C4 missiles have been declared at six under the Strategic Arms Reduction Treaty (START). The Navy continues to address future deterrence requirements against weapons of mass destruction and disruption, and the Trident II/D5 will ensure that the United States has a modern, survivable strategic deterrent.

Status
FY 2007 funding will be dedicated to the D5 life extension program. Full missile procurement begins in FY 2008 ending in FY 2012 with a total acquisition of 108 additional missiles.

Developers
Lockheed Martin; Sunnyvale, California

Stabilized 25-mm Chain Gun

Description
This upgrades the current MK-38 25mm chain gun with stabilization, remote operation, fire control, and EO sensor. The program fills the surface self-defense capability gap for ships that

are not CIWS BLK 1B configured, and is designed to engage real-time asymmetric threats at close range to ships in port, at anchor, or while transiting choke points or operating in restricted waters. It provides the capability to bridge current and future targeting and weapons technology in a close range Force Protection environment.

Status
PB 2007 budget funds 139 stabilized mounts, which will be fielded on all ship classes to fill the gap until CIWS BLK 1B can be fully fielded. The FY 2004 contract was awarded in June 2004 and the first two systems were delivered in December 2004.

Developers
United Defense; Louisville, Kentucky
Rafael, Inc.; Haifa, Israel

SENSORS
AIRBORNE

AAR-47 Missile Approach Warning System (MAWS)

Description
The AAR-47 is a passive, MAWS consisting of four sensor assemblies housed in two or more sensor domes, a central processing unit, and a control indicator. Employed on helicopters and transport aircraft across U.S. Armed Services, the AAR-47 MAWS warns of threat missile approach by detecting radiation associated with the rocket motor and automatically initiates flare expenditure. The MAWS provides attacking missile declaration and sector direction finding and will be interfaced directly to the ALE-39/47 countermeasures dispenser. The AAR-47(V)2 upgrade, which is in full-rate production, will improve missile warning performance, add laser warning functionality, and reduce operations and support costs of existing AAR-47 systems. Without the AAR-47, helicopters and fixed-wing aircraft have no infrared missile detection capability.

Status
AAR-47(V)2 is currently in early, full-rate production. Work has begun on an advanced two-color IR Missile Warning Sensor and laser-based countermeasure, which were demonstrated by the Tactical Aircraft Directed Infra-Red Counter-Measure (TADIRCM) Advanced Technology Demonstration (ATD). This revolutionary technology will be fielded in a future version of AAR-47. The Navy plans to buy one AAR-47(V)2 for every new assault support aircraft in the FYDP (MV-22, UH-1Y, AH-1W, KC-130J, etc). The procurement objective for retrofit kits is 1,090.

Developers
Alliant Defense Electronic Systems; Clearwater, Florida

ALR-67(V)3 Advanced Special Receiver

Description
The ALR-67(V)3 is a Radar Warning Receiver (RWR) designed to meet Navy requirements through the year 2020. It will enable Navy F/A-18E/F aircraft to detect threat radar emissions, enhancing aircrew situational awareness and aircraft survivability.

Status
The ALR-67(V)3 program successfully completed EMD phase and operational testing in 1999 and is in full-rate production. Production quantities will eventually outfit all F/A-18E/F aircraft.

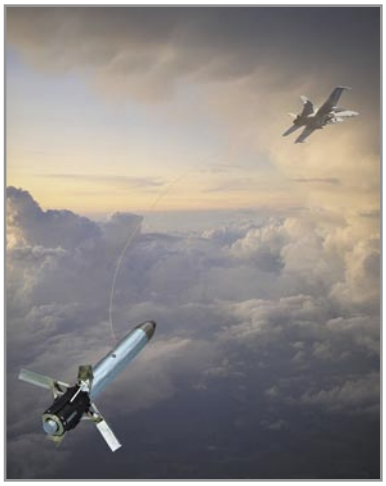
Developers
Raytheon; Goleta, California

ALQ-214 Integrated Defensive Electronic Counter-Measures (IDECM)

Description
Employed on the F/A-18E/F, the ALQ-214 IDECM is used to defend the host aircraft against radar-guided Surface-to-Air Missile (SAM) systems. Either through a towed decoy or several onboard transmitters, the ALQ-214 produces complex waveform radar jamming that defeats advanced SAM systems.

Status
The ALQ-214 and ALE-50 (towed decoy) combination are currently in full-rate production. The ALE-55 Fiber Optic Towed Decoy is currently in developmental test and is scheduled to begin operational test in FY 2006.

Developers
BAE Systems; Nashua, New Hampshire



Naval Aviation Improved Chemical, Biological, Radiological Nuclear Defense (CBRND)

Description
The Naval Aviation CBRND program is part of a joint-service effort to provide the warfighter with the means to sustain flight operations during the threat or use of Chemical and Biological (CB) weapons of mass destruction. Naval Aviation is the lead service for the Joint Protective Aircrew Ensemble (JPACE) chemical/biological protective flight suit, which provides percutaneous protection from CB warfare agents. Naval Aviation is also participating in the development of the Joint Service Aircrew Mask, which provides head-eye-respiratory CB protection. Furthermore, Naval Aviation is participating in several joint CBRND developmental and acquisition programs that will provide the capability for in-flight automated point and standoff detection of chemical agents, as well as fielding solutions and applicators to restore aviation assets by thorough decontamination of aircrew personnel, aircraft, and sensitive equipment.

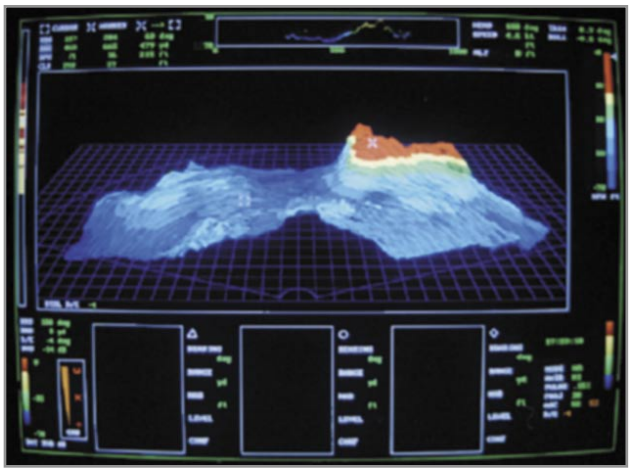
Status
JPACE Operational Test Readiness Review (OTRR), was completed in July 2005 with approval to proceed with the Navy portion of the operational testing. JPACE IOC is planned for first quarter FY 2008. The JSAM formal Request for Proposal (RFP) for the initial fixed-wing and helicopter variants was released in September 2005. Proposals are currently under review in Source Selection. JSAM IOC is planned for first quarter FY 2009.

Developers
Innovative Apparel (JPACE production); Belfast, Maine
Scott Aviation (JSAM development); Buffalo, New York

SUBSURFACE

BQQ-10 Acoustic Rapid COTS Insertion (ARCI)

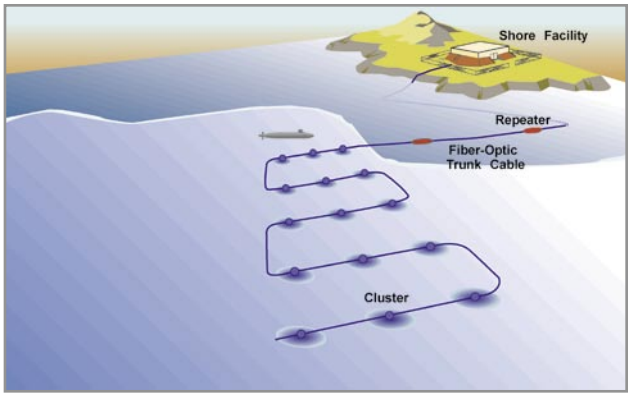
Description
ARCI Insertion is a three-phase program that replaces existing legacy submarine sonar systems, including BQQ-5 (SSN 688), BSY-1 (SSN 688I), BSY-2 (SSN 21), and BQQ-6 (SSBN 726) sonar, with a more capable and flexible COTS-based Open Systems Architecture (OSA), and provides the submarine force with a common sonar system. It allows development and use of complex algorithms that were previously well beyond the capability of legacy processors. The use of COTS/OSA technologies and systems will enable frequent periodic updates to both software and hardware with little or no impact on submarine scheduling. COTS-based processors allow computer power growth at a rate commensurate with commercial industry. A key facet of the sonar ARCI program (now designated BQQ-10) includes the Submarine Precision Underwater Mapping and Navigation (PUMA) upgrade. This consists of software processing improvements delivered as part of Advanced Processor Build (APB) 02, to the BQQ-10 High Frequency (HF, ARCI Phase IV) and BQS-15 EC-19/20 sonar systems. This enhancement provides submarines with the capability to map the ocean floor and register geographic features, including mine-like detections, and display the map in a 3-D representation. This capability to precisely map the ocean floor allows submarines to conduct covert battlespace preparation of the sea bottom as well as survey and avoid minefields with impunity. These digital maps can be compressed and transmitted to other naval forces for display on sea-based and land-based platforms. Additionally, the open architecture design of the ARCI system allows for the rapid inclusion of advances in sensor systems and processing techniques at minimal cost. New sensor systems, such as the low cost conformal array, large vertical array, and advanced towed arrays currently in development, will be incorporated in the ARCI system through annual advanced processor build (APB) software improvements.



Status
ARCI Phase II (FY 1999) provided substantial towed and hull array software and hardware processing upgrades that significantly improved LF detection capability. Phase III (FY 2001) augments the current Spherical Array DIMUS beam-former with a linear beam-former and enhanced processing that improves MF detection capability. Phase IV (FY 2001) upgrades the HF sonar on late-generation, improved *Los Angeles* (SSN 688I)-class submarines. Each phase installs improved processing and workstations (point click trackballs, Windows environment). Recent, real world encounters have consistently demonstrated overwhelming success of this program to restore U.S. acoustic superiority. ARCI completed OPEVAL in FY 2003. The BQQ-10 sonar system is being installed as rapidly as possible given the available funding. Additional funding will accelerate vital improvements to towed array processing in support of fleet operations, accelerated delivery of organic Mine Countermeasures capability inherent in ARCI Phase IV and PUMA, and completing Phase III upgrades for all submarines. Navy research, development, testing, and evaluation will continue to develop processing algorithms from the surveillance, tactical and advanced R&D communities as well as perform laboratory and at-sea testing, and distribute upgrades periodically.

Developers
Lockheed Martin; Manassas, Virginia
General Dynamics Advanced Information Systems; Fairfax, Virginia
Advanced Research Laboratory, University of Texas at Austin; Austin, Texas

Fixed Distributed System Commercial Off-The-Shelf (FDS-C)



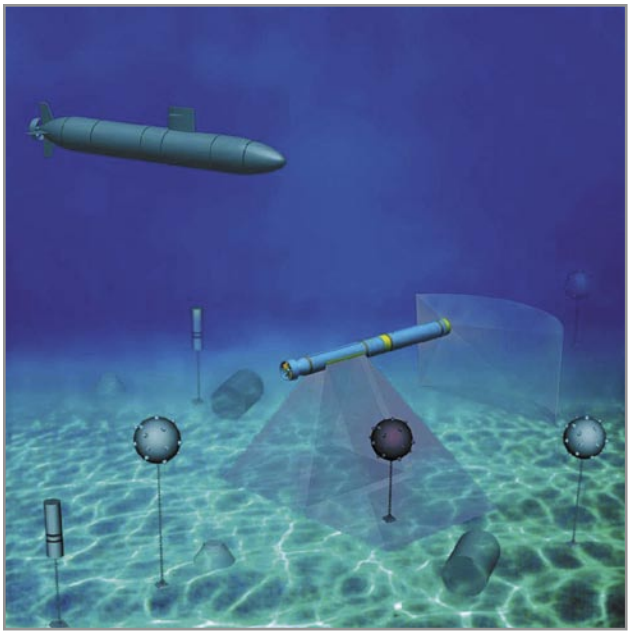
Description
FDS-C is a COTS version of the long-term, passive acoustic fixed surveillance FDS system. FDS-C provides threat location information to tactical forces and contributes to an accurate maritime picture for the Joint Force Commander. Due to its strategic positioning and long lifetime, it provides indication and warning of hostile maritime activity before conflicts begin.

Both FDS and FDS-C comprise a series of arrays deployed on the ocean floor in deep-ocean areas, across straits and other chokepoints, or in strategic shallow water littoral areas. The system is made up of two segments: the Shore Signal and Information Processing Segment (SSIPS), which handles the processing, display, and communication functions, and the Underwater Segment, which consists of a large area distributed field of acoustic arrays. FDS-C was developed as a less-expensive follow-on version of FDS by converting to COTS equipment. Taking advantage of advances made in the commercial industry provides a much more cost-effective FDS-caliber system to meet the fleet's ongoing needs for long-term undersea surveillance. Additionally, the program is pursuing the development of other technologies, such as an all-fiber-optic hydrophone passive array, to further increase system reliability and performance at reduced cost.

Status
FDS and FDS-C processing are being upgraded with the Integrated Common Processor (ICP) that will result in increased operator proficiency, increased functionality and savings in logistics support and software maintenance.

Developers
Tyco Integrated Cable Systems; Portsmouth, New Hampshire
Northrop Grumman Electronic Systems (Formerly Litton Guidance & Control Systems); Woodland Hills, California
MariPro; Santa Barbara, California

Unmanned Undersea Vehicles (UUV)



Description
Several acquisition programs are ongoing within the Navy to field UUV systems to improve current Navy Sea Shield capabilities in enabling assured access. The 2004 Navy UUV Master Plan prioritizes UUV missions to support *Sea Power 21*, and maps intended missions to four distinct vehicle classes (by size). The three highest priority UUV missions—ISR, MCM, and ASW—are the focus of current R&D efforts.

The Long-Term Mine Reconnaissance System (LMRS)—under development—will provide several technologies key to developing a capability to conduct clandestine minefield reconnaissance. In 2005, two LMRS vehicles proved clandestine launch and recovery, autonomous operation, and provided critical battery technology and integration development to enable up to 40 hours of endurance in the littorals.

The Mission Reconfigurable UUV (MRUUV) began development in FY 2005 and will provide a robust capability to conduct clandestine minefield reconnaissance and Intelligence, Surveillance, and Reconnaissance (electro-magnetic and electro-optical ISR, and Indications and Warning). The MRUUV will include unique capabilities, such as submarine launch and recovery and autonomous operation endurance of more than 40 hours. Sensor and system enhancements are being pursued to expand capabilities in the areas of Precision Underwater Mapping and Navigation, Synthetic Aperture Sonar, Acoustic Communications, and high-density renewable energy sources. The 21-inch MRUUV will be of similar size and shape as LMRS and will build upon the LMRS design by sharing certain components and support systems. MRUUV represents an enhanced capability by providing reconfigurable sensor packages for potential missions such as remote ASW tracking, undersea search and survey, communications and navigation aids and monitoring for weapons of mass destruction. A Large Displacement MRUUV will be developed as a follow-on to the 21-inch MRUUV and will bring enhancements in endurance and sensor packages.

The small UUV program is crucial to Explosive Ordnance Disposal (EOD) and the Expeditionary Mobile Diving and Salvage mission of enabling access to beaches, harbors, piers, and inland waterways. The small UUV will shorten timelines and increase safety for the clearance of mines and obstacles from these areas. Eventually, small UUVs will assume the roles of EOD divers and Marine Mammal Systems in the location and neutralization of mines. As no single small UUV is capable of addressing the needs of operational units and missions that they support, a system of systems acquisition approach is required.

Naval Special Clearance Team ONE (NSCT-1) UUVs support amphibious and mine warfare forces by deploying from small craft to enable rapid search, classification, mapping, reacquisition, identification, and neutralization tactical operations near hostile shores in the VSW zone between 10 and 40 feet of sea water.

EOD UUVs will be used to search for and localize unexploded ordnance hazards including mines, submerged munitions, and weapons of mass destruction. They will also conduct ship hull searches in support of Force Protection and other fleet support operations. Surface Mine Countermeasure (SMCM) UUVs will complement existing and future SMCM, reduce platform risk and improve the overall tactical timeline for MCM operations.

Status

Since inception, EOD and NSCT-1 UUV programs have been on accelerated schedules. NSCT-1 and EOD UUV interim systems have been fielded and engaged in real world operations. During Operation Iraqi Freedom, NSCT-1 UUVs were deployed in the port of Umm Qasr operating in strong currents and low visibility and validated their operational value to fleet operations. EOD UUVs were used to support Space Shuttle Columbia underwater search and recovery operations and, recently, hurricane Katrina recovery operations. The use of these UUVs reduced the tactical timeline, minimized risk to man-in-the-minefield systems and improved overall mission effectiveness.

The final NSCT-1 S-C-M UUV system prototype evaluation is complete and a production decision was reached in July 2005. IOC for the NSCT-1 S-C-M UUV system will occur in FY 2006. The NSCT-1 Reacquire and ID UUV program component will reach IOC in FY 2007, with the Neutralization UUV component reaching a production decision in FY 2010. The neutralization component will provide a low-cost mine neutralization capability to the fleet, NSCT-1, and EOD operators.

The LMRS completed detail design in August 1999 and is in the EMD Phase. Submarine launch and recovery test is scheduled for completion in February 2006. The 21-inch MRUUV ORD is under review at the joint staff level, with a Milestone B decision expected by June 2006. The SAHRV program recently completed operational evaluation. The FY 2007 request includes funding for development of 21-inch MRUUV and LDUUV.

Developers
LMRS: Boeing; Anaheim, California
SAHRV: Woods Hole Oceanographic Institution
NSCT-1:Bluefin Robotics and Hydroid
EOD: Lockheed Martin, Perry Technologies, Bluefin Robotics
SMCM: Hydroid

SUBSURFACE, SURFACE, AND EXPEDITIONARY

WLD-1 Remote Minehunting System (RMS)

Description
The WLD-1 RMS consists of an unmanned vehicle with an AQS-20A Sonar to conduct minehunting operations. The RMS can be launched from the DDG 51 class destroyer and will be incorporated in the design of LCS. RMS is designed to be launched with a pre-programmed search pattern and go over the horizon to search for mines using the AQS-20A Sonar. Once the mission is completed, RMS will return to the ship and data will be downloaded for Post-Mission Analysis (PMA).

Status
Milestone C and LRIP I occurred in FY 2005. IOC is scheduled in FY 2007. First deployment of RMS is scheduled to occur in FY 2007 on DDG 91 class destroyer and on LCS in FY 2010.

Developers
Lockheed Martin; Riviera Beach, Florida

SURFACE AND EXPEDITIONARY

Area Air Defense Commander (AADC)

Description
The AADC capability provides a maritime and shore-based operational-level planning and execution tool for air defense operations under the Joint Theater Air and Missile Defense (JTAMD) concept. In the early stage of a contingency, the preponderance of forces will likely be sea-based. Carrier Strike Groups will act as the hub of rapidly expanding joint force structure. A maritime-based or strategically-located ashore AADC Capability provides the tools necessary to plan and conduct operations in support of air defense throughout the spectrum of conflict. Current and future JTAMD operations require an advanced common Battle Management/Command, Control, Communications, Computers, Intelligence (BMC4I) architecture. This includes a Single Integrated Air Picture (SIAP) and the capability for centralized planning and decentralized execution. The AADC Capability will permit rapid re-planning and course of action evaluations. With the AADC capability, more of the Air Defense Planner's effort can be spent on analysis instead of data collection and input. The system employs a "six degrees of freedom" modeling capability to

optimize force laydown and employment to achieve the desired level of protection.

Situational awareness is provided by a 3-D tactical operations display system. The 3-D capability provides the ability to view the battlespace from any direction or altitude. This display capability provides a common picture through fusion of all available tactical data links and sensor information into an easily understood picture that enables the AADC to exercise command by exception. The AADC capability consists of a suite of high-performance computers and displays employing advanced software on a series of state-of-the-art processors. The AADC capability also provides a distributed, collaborative planning feature that permits the AADC staff to interact rapidly with counterparts in other staffs.

Status

There are six fielded, full suite units: Three maritime units are fielded onboard the USS *Shiloh* (CG 67), USS *Blue Ridge* (LCC-19), and USS *Mount Whitney* (LCC-20). One shore facility has been installed at the Joint National Integration Center (JNIC) at Schriever Air Force Base in Colorado. A second shore facility was installed in FY 2004 at the Joint Forces Command Joint Program Office (JFCOM JPO) program facility in Panama City, Florida. The third shore site is Tactical Training Group-Atlantic in Virginia Beach, Virginia. These shore sites will be used to analyze the capability's relevance to the Ballistic Missile Defense (at JNIC) and Air and Missile Defense (at JFCOM) and demonstrate the system's unique functionality to the joint community. Three deployable clients are also available to support additional capability testing either ashore or afloat.

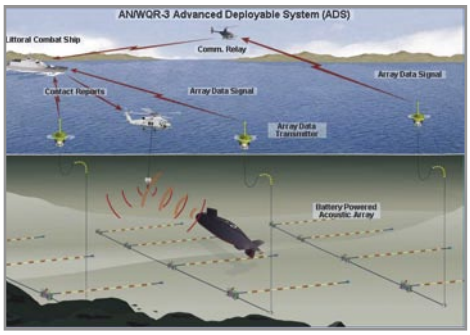
Developers

Johns Hopkins University Applied Physics Laboratory (Prototype); Laurel, Maryland
General Dynamics Advanced Information Systems (Production unit); Greensboro, North Carolina

Advanced Deployable System (ADS)

Description

ADS is a rapidly deployable passive acoustic undersea surveillance system designed to detect and track modern diesel-electric submarines and surface craft in littoral regions. At sea, demonstrations of ADS have validated the ability of the system to achieve its primary mission, as well as detect small fast boats, air cushion craft, and low-flying aircraft. ADS has potential detection capability against mine-laying operations and movement of vehicles ashore in the near-coastal zone. ADS employs distributed battery-powered acoustic arrays linked by small-diameter fiber optic cable over which hydrophone data is optically telemetered. The system is modular and configurable for specific missions and can be deployed from a number of different platforms. ADS is composed of: a Sensor Subsystem (SS) consisting of hydrophone arrays, cabling,



and pressure vessels containing supporting electronics and power; an Installation Subsystem (ISS) consisting of the equipment aboard the installation vessel that supports system deployment; a Tactical Interface Subsystem (TIS) that transmits array data to a receiver aboard the monitoring platform; and an Analysis and Reporting Subsystem consisting of data processors and displays.

ADS processing software leverages the Navy's Advanced Rapid COTS Insertion (ARCI) program and the mission planning software leverages the Navy Mine Warfare community's software planner, the Mine Warfare and Environmental Decision Aids Library (MEDAL).

Status
ADS is in the System Development and Demonstration Phase after a Milestone B decision in the first quarter of FY 2006. ADS is an Acquisition Category (ACAT) I C program. The program is structured to initially develop ADS as an off-board sensor system installed by the Littoral Combat Ship (LCS). Development of delivery from alternate platforms will begin in FY 2009.

Developers
Lockheed Martin Maritime Systems and Sensors;
Manassas, Virginia
Raytheon Integrated Defense Systems;
Portsmouth, Rhode Island
Ocean Power Technologies; Pennington, New Jersey
Harris Corporation; Melbourne, Florida
Orincon Defense; San Diego, California
Lockheed Martin, Perry Division; West Palm Beach, Florida

Airborne Laser Mine Detection System (ALMDS)

Description
The ALMDS is an organic, high-area coverage, electro-optic Airborne Mine Countermeasures (AMCM) laser system that detects, classifies, and localizes floating and near-surface moored sea mines. Deployed from the MH-60S helicopter, ALMDS will satisfy the Navy's need for a quick-response, wide-area, organic MCM reconnaissance system that can rapidly detect and classify mine-like contacts for subsequent prosecution. This capability will be critical in littoral zones, confined straits, choke points, and Amphibious Objective Areas. ALMDS offers a much greater area search rate than other types of AMCM equipment, and it represents a capability that does not exist in the current inventory.

Status
A competitive contract was awarded in April 2000 for development of an integrated ALMDS system for the MH-60S. Milestone C and LRIP I occurred in FY 2005. The IOC is scheduled for CY 2008.

Developers
Northrop Grumman; Melbourne, Florida

AQS-20A Mine-Hunting Sonar

Description

The AQS-20A is an underwater mine-detection sonar that also employs an Electro-Optic Identification (EOID) sensor capable of locating and identifying bottom, close-tethered, and moored sea mines. The AQS-20A mine-hunting system will be deployed and operated from the MH-60S helicopter as one of five organic Airborne Mine Countermeasures (AMCM) weapon systems resident in the carrier/expeditionary strike group onboard the Littoral Combat Ship (LCS). The AQS-20A system will also serve as the mine sensor subsystem of the Remote Mine Hunting System (RMS) hosted onboard Navy surface warships. The operational RMS system will be installed in the *Arleigh Burke* (DDG 51) Flight IIA Aegis guided missile destroyers beginning with DDG 91.

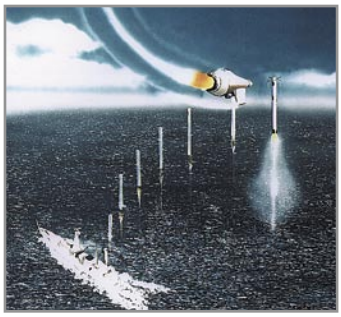
Status

Milestone C and LRIP I occurred in FY 2005. The IOC is scheduled for FY 2006. Improvements to Computer Aided Detection/Computer Aided Classification and Environmental Data Collection capabilities are being implemented via enhanced research and development efforts.

Developers

Raytheon; Portsmouth, Rhode Island

Nulka Radar Decoy System



Description

Nulka is an active, off-board, ship-launched decoy developed in cooperation with Australia to counter a wide spectrum of present and future radar-guided anti-ship cruise missiles. The Nulka decoy employs a broadband radio frequency repeater mounted atop a hovering rocket platform. After launch, the Nulka decoy radiates a large, ship-like radar cross-section flying a trajectory that seduces and decoys incoming ASCMs away from their intended targets. Australia developed the hovering rocket, launcher, and launcher interface unit. The U.S. Navy developed the electronic payload and fire control system. The existing MK-36 Decoy Launching System (DLS) has been modified to support Nulka decoys, resulting in the MK-53 DLS.

Status

Nulka received Milestone III approval for full-rate production in January 1999; installation began on U.S. and Australian warships in September 1999.

Developers

BAE Systems; Edinburgh, Australia
SECHAN Electronics; Lititz, Pennsylvania
Lockheed Martin Sippican; Marion, Massachusetts

Organic Airborne and Surface Influence Sweep (OASIS)

Description

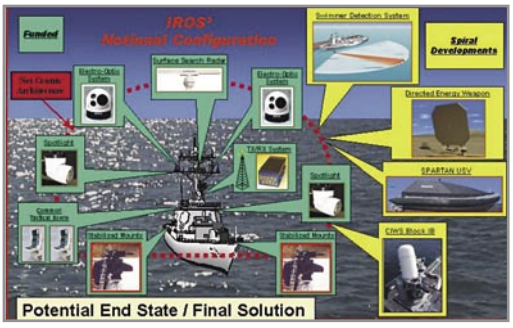
The OASIS system will provide the strike group with an organic, high-speed, magnetic/acoustic influence minesweeping capability to effectively neutralize sea mine threats in operating areas where mine hunting is not possible due to mine burial or high bottom clutter. The OASIS system is one of five under-development Airborne Mine Countermeasures (AMCM) weapon systems to be deployed and operated from the MH-60S helicopter (see MH-60S program summary).

Status

Milestone C and LRIP I are scheduled for FY 2007. IOC is scheduled for 2008.

Developers

EDO Corporation; New York, New York



Shipboard Protection System (SPS)

Description

SPS Increment I is designed to augment current Naval Force Protection Tactics and Doctrine by providing a means to detect, classify, and engage real-time surface threats at close-range to ships in port, at anchor, and while transiting choke points or operating in restricted waters. The system will provide 360-degree Situational Awareness (SA) and will employ COTS integration to support incremental modifications as needed to tailor the system to the mission. It will provide the capability to bridge current and future technology by integrating current Force Protection initiatives and combat system technologies while sustaining mission-capable combatant force levels. A prototype system installed in the USS *Ramage* (DDG 61) provided the functional demonstration of what will become the SPS Increment I. The demonstration system employed COTS-based products interfaced with the SPS-73 surface search radar and its key components included electro-optical/infra-red devices, an integrated surveillance system, spotlights, acoustic hailing devices, and remotely operated stabilized small arms mounts. The prototype system installed in *Ramage* gained valuable fleet feedback, lessons learned, and integrated logistics support information which helped define requirements for SPS Increment I.

Status

SPS was approved at Milestone B for system design and development in January 2005. The Capabilities Development Document was approved in January 2005. A competitive contract was awarded to the Northrop Grumman Electronic Systems (NGES) development team in August 2005.

Developers
Northrop Grumman Electronic Systems, Lead Integrator; Charlottesville, Virginia
Science Applications International Corp, Integration and Logistics; Bloomington, Indiana
Ocean Systems Engineering Corp., Software Engineering and Sensors; San Diego, California
General Dynamics Armament and Technical Products (ATP), Weapons Mount; Charlotte, North Carolina

Solid-State SPY Radar (SS-SPY)
Next-Generation Theater Air & Missile Defense, Multi-Function Advanced Active Phased-Array Radar

Description
The SS-SPY advanced radar system is being developed as the primary air and missile defense radar for the Navy's next-generation cruiser CG(X). It is a multi-function, active phased-array radar capable of search, detection, tracking of airborne and ballistic missile targets, and missile engagement support. The advanced functions of this radar include multi-mission performance in a stressing environment that will enable simultaneous defense from all Theater Air and Missile Defense (TAMD) threats. The multi-mission capability will be effective in both air dominance of the battle space (Area Air Warfare) and in defense against ballistic missiles.

Status
The SS-SPY Radar is being developed as a competitive program and the requirements definition began this year, along with several risk-reduction projects to mature technologies for this advanced radar. The design and development after competitor down-select will lead to EDM development, testing, and production to support the IOC for CG(X).

Developers
To be determined.

SPQ-9B Radar Anti-Ship Cruise Missile (ASCM) Radar Improvement Program

Description
The SPQ-9B is a slotted, phased-array, rotating radar that significantly improves the ability of ships to detect and track low-altitude Anti-Ship Cruise Missiles (ASCM) in a heavy clutter environment. Its high-resolution track-while-scan, X-band, pulse-Doppler radar enables detection and establishment of a firm track at ranges allowing the combat system to engage subsonic or supersonic sea-skimming missiles at the outer edge of a ship's engagement envelope. SPQ-9B integrates with SSDS MK-2 on aircraft carriers and amphibious assault ships. Together these systems improve those ships' ASCM defense capabilities to pace the evolving world-

wide threat. The SPQ-9B is also an integral part of the Cruiser Modernization program, providing an ASCM cue to the Aegis Combat System.

Status
The SPQ-9B is being fielded in conjunction with SSDS MK-2 and CG Modernization.

Developers
Northrop Grumman; Melville, New York

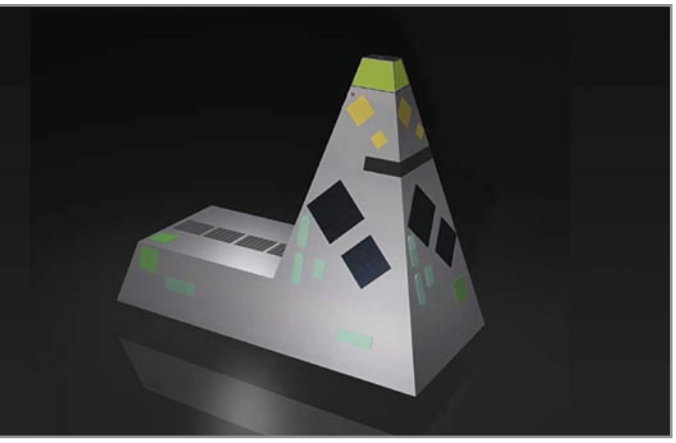
SPY-1 Aegis Multi-Function Phased-Array Radar

Description
The SPY-1 S-Band radar system is the primary air and surface radar for the Aegis Combat System installed in the *Ticonderoga* (CG 47) and *Arleigh Burke* (DDG 51)-class warships. It is a multi-function, passive phased-array radar capable of search, automatic detection, transition to track, tracking of air and surface targets, and missile engagement support. The fifth variant of this radar, SPY-1D(V), improves the radar's capability against low-altitude, reduced radar cross-section targets in heavy clutter environments, and in the presence of intense electronic countermeasures. The SPY-1 Series radars are also used to detect, track, and engage theater ballistic missiles on select Aegis Cruisers and Destroyers.

Status
The SPY-1D (V) littoral radar upgrade supersedes the SPY-1D in new-construction Flight IIA destroyers that began in FY 1998. Operational testing and evaluation was completed in the fall 2005. SPY-1D (V) is installed in DDGs 91 through 101 and programmed for installation in DDGs 102 through 112.

Developers
Lockheed Martin; Moorestown, New Jersey
Raytheon; Sudbury, Massachusetts

SPY-3 Multi-Function Radar (MFR)



Description
The SPY-3 MFR is an X-band active phased-array radar designed to meet all horizon search and fire control requirements for the 21st Century fleet. MFR is designed to detect the most advanced low-observable Anti-Ship Cruise Missile (ASCM) threats and support fire-control illumination requirements for the Evolved Sea Sparrow Missile (ESSM), the Standard Missile II (SM-2) and future missiles required to engage the most stressing ASCMs. The MFR also supports the new ship-design requirement for reduced radar cross-section, significantly reduced manning (no operators), and total ownership cost reduction. The MFR is planned for introduction in DD(X) and the next-generation CVN 21 aircraft carriers.

Status
Two Engineering and Manufacturing Development (EDM) radar arrays were built and tested at Wallops Island land-based testing facility. An Engineering Development Model will be tested at sea in FY 2006. Production of the MFR is planned to support equipment delivery schedules for DD(X) and CVN 21. The MFR will be fielded as integrated radar with the S-Band Volume Search Radar (VSR), together referred to as the Dual-Band Radar Suite (DBRS). Operational evaluation will occur with DD(X) testing. IOC for the DBRS is expected to be 2013.

Developers
Northrop Grumman Ship Systems (Prime);
Pascagoula, Mississippi
Raytheon Electronic Systems (Subcontractor);
Sudbury, Massachusetts

SQQ-89 Anti-Submarine Warfare (ASW) Combat System

Description
The SQQ-89 ASW combat system suite provides *Oliver Hazard Perry* (FFG 7), *Ticonderoga* (CG 47), and *Arleigh Burke* (DDG 51)-class surface warships with an integrated undersea warfare detection, classification, display, and targeting capability. The system combines and processes all sonar information, and processes and displays all SH-60B Light Airborne Multi-Purpose System (LAMPS) MK III sensor data. The current system comprises the following subsystems:

- **SQS-53C/D active/passive hull-mounted sonar (SQS-56 in FFGs)**
- **SQR-19 Tactical Towed Array System (TACTAS)**
- **MK-116 ASW fire control system**
- **SQQ-28 sonobuoy processor**
- **SRQ-4 SH-60B helicopter data link**
- **UYQ-25B Sonar In-situ Mode Assessment System (SIMAS)**
- **USQ-132 Tactical Display Support System (TDSS)**
- **SQQ-89(T) Onboard Trainer (OBT)**

The analog receivers of the SQS-53A/B hull-mounted sonar are being upgraded to digital receivers by the use of COTS processors, and are redesignated SQS-53D. Planned improvements to the SQQ-89(V) include:

- **MH-60R (LAMPS MK III) integration**
- **SRQ-4 Data Link Upgrade**
- **Multi-Function Towed Array (MFTA) that will provide low and mid-frequency bi/multi-static receiver capability between the SQS-53C, the MH-60R Airborne Low-Frequency Active Sonar (ALFS), and off-board systems**
- **Remote Mine-Hunting System (RMS) processing and display**

- **Echo Tracker Classifier (ETC) active classification capability**
- **SIMAS upgrade to updated performance prediction models**
- **Computer-Aided Dead-Reckoning Table (CADRT)**
- **Torpedo Recognition and Alertment Functional Segment (TRAFS)**

Status

New system acquisitions are for DDG 51 new-construction. Required modernization of existing systems for the shallow water littoral warfare environment is being accomplished by the use of COTS processors and displays. Starting in FY 2003, SQQ-89(V) 15+MFTA systems, designated SQQ-89A (V)15, were being procured for back-fit installations in CG 47 surface warships with DDG 51 warships beginning back-fit in FY 2008. The DDG 51 back-fit of SQQ-89(V) 15 was accelerated from FY 2009 to FY 2006. The first DDG 51 back-fit system will be purchased in FY 2006 and installed in FY 2008 with 22 follow-on units purchased across the FYDP. Seven DDG Scaled Improved Performance Sonar (SIPS) upgrades will begin back fit in FY 2006 with follow-on of 27 more units across the FYDP.

Developers

Lockheed Martin; Syracuse, New York
Advanced Acoustic Concepts; Hauppauge, New York

Ship-Self Defense System (SSDS)

Description

SSDS provides the integrated combat system for aircraft carriers and amphibious ships, enabling them to keep pace with the anti ship cruise missile (ASCM) threat. Moving toward an open-architecture distributed-processing system, SSDS integrates the detection and engagement elements of the combat system. With automated weapons control doctrine, Cooperative Engagement Capability (CEC), and enhanced battle space awareness, SSDS provides these ships with a robust self-defense capability in support of Sea Shield.

Status

SSDS was approved for full-rate production following operational testing in 1997. IOC occurred in 1997 with the deployment of SSDS MK-1 in the USS *Ashland* (LSD 48). SSDS MK-1 has subsequently been installed in all 12 *Whidbey Island* (LSD 41)-class ships. A more advanced version, SSDS MK-2, is being fielded in aircraft carriers, the *Wasp* (LHD 1) and *San Antonio* (LPD 17) ship classes. By the end of 2011, 21 ships will have received the SSDS MK-2 system, including the Self-Defense Test Ship.

Developers
Raytheon; San Diego, California
Technical support: Johns Hopkins University Applied Physics Laboratory; Laurel, Maryland
Naval Surface Warfare Centers; Port Hueneme, California
Naval Surface Warfare Centers;
Dahlgren and Dam Neck, Virginia

Surface Electronic Warfare Improvement Program (SEWIP) Block 1 Upgrade

Description
SEWIP is a spiral development block upgrade program for the SLQ-32 Electronic Warfare (EW) system, which is installed on all combatants and auxiliaries in the U.S. Navy, with total fleet wide population of 170 systems.

Block 1A replaces the processor with Electronic Surveillance Enhancement (ESE) and display console with UYQ-70. The ESE and UYQ-70 are integrated with Improved Control and Display (ICAD) software. Block 1A also improves Human Machine Interface of the SLQ-32.

Block 1B adds Specific Emitter Identification (SEI) capability which offers extremely accurate platform identification; it will be deployed initially as a stand-alone SSX-1 systems (Block 1B1) pending integration of SEI with other capabilities (Block 1B2). Block 1B3, High Gain High Sensitivity (HGHS), receiver functionality provides improved situational awareness through non-cooperative detection and ID of all airborne platforms, beyond radar horizon and overland passive surveillance supporting all mission areas, provides extended Nulka queuing ranges. Additional improvements (e.g., initial Network-Centric Warfare Electronic Support (NCWES) interfaces) and upgraded software and displays provide integration of capabilities.

Block 1C will incorporate Block 1A and 1B upgrades for active ships (CVN, CG, LHD, LHA, DDG 68-83) and two-way connectivity to Global Command Control System-Maritime netting all Electronic Warfare assets, both local and national.

Status
SEWIP was established as an ACAT II program in July 2002 as a replacement of the cancelled Advanced Integrated Electronic Warfare System (AIEWS). Acquisition Decision Memorandum (ADM) of 13 August 2002 authorized the SEWIP to proceed with Block 1A and initiate development of Blocks 1B and 1C. Block 1A Stand-Alone ESE reached at Milestone C/ LRIP decision on 31 January 2005. ICAD/UYQ-70 LRIP is currently planned for the first quarter of FY 2006, and Block 1A full-rate production is planned for FY 2006. Block 1B1, SSX-1, has been authorized as a Rapid Deployment Capability (RDC) for fielding stand-alone SEI capability. Development efforts of Blocks 1B2 and 1B3 are progressing toward FY 2007 TECHEVAL/OPEVAL.

Developers
Northrop Grumman PRB Systems; Goleta, California
Lockheed Martin; Eagan, Minnesota
General Dynamics Advanced Information Systems; Fairfax, Virginia

Surface Ship Torpedo Defense (SSTD)

Description
The SSTD project consists of the WSQ-11 Torpedo Defense System, the SLQ-25A Nixie towed torpedo countermeasure, and expendable acoustic decoys. The purpose of these systems is to provide underwater torpedo protection for all major surface ship types to include aircraft carriers, surface combatants, logistics ships, and military sealift command (MSC) ships.

The WSQ-11 Torpedo Defense System includes the functionality of the Nixie countermeasure as well as a towed Detection, Classification, and Localization (DCL) subsystem, and a hard kill Anti-Torpedo Torpedo (ATT). The DCL component consists of a towed, active/passive sonar to include a high power transmission source and an acoustic intercept receiver. The DCL array is sized to fit on the existing Nixie handling equipment and use the same deck space and electronics cabinets. The DCL subsystem can trigger an ATT engagement in either automatic or semi-automatic modes, manual ATT launch mode is also available.

The SLQ-25A Nixie is a towed electro-acoustic countermeasure currently in Fleet service. Performance and reliability upgrades have been in progress since 2004 and will continue through 2009. In addition to Nixie, over-the-side deployed Acoustic Decoys are being acquired to provide an effective and low-cost near term solution to the torpedo defense problem.

Status
The SSTD project is on track to meet the near-term objective of concurrently developing and demonstrating the DCL subsystem and the ATT. Contracts have been awarded by NAVSEA to two prime contractors for the purpose of developing two independent DCL systems that will be tested side by side at sea in a late FY 2006 demonstration. This demonstration will include the firing of approximately ten torpedo test vehicles simulating threat torpedoes against each of the two systems to evaluate their effectiveness. The ATT is currently in development at the Penn State University Applied Research Laboratory (ARL) and is undergoing an aggressive testing and development phase with two major in-water test events in FY 2006. The ATT effort and DCL effort will marry up following these demonstrations. The SSTD project is expected to meet a Milestone B acquisition program decision in early FY 2008 with delivery to the fleet by late FY 2012.

Developers
Anti-Torpedo Torpedo: Penn State Applied Research Laboratory; State College Pennsylvania
DCL Systems: Advanced Acoustic Concepts; Long Island, New York
Ultra Electronics; Braintree, Massachusetts
Technical Design Authority: The Naval Undersea Warfare Center; Newport, Rhode Island

Tactical Control System (TCS)

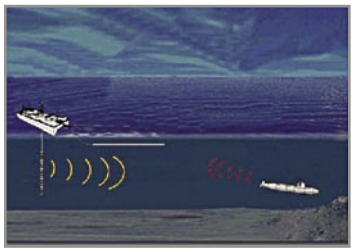
Description
TCS provides interoperability and commonality for mission planning, Command and Control (C2), and C4I interfaces for tactical and medium altitude Unmanned Aircraft Systems (UAS). TCS provides a full range of scaleable UAS capability from passive receipt of air vehicle and payload data to full air vehicle and payload C2. TCS offers the warfighter a common core operating environment to receive, process, and disseminate UAS data from two or more different UAS types for reconnaissance, surveillance, and combat assessment. In conjunction with Fire Scout and Littoral Combat Ship (LCS), TCS is positioned to support Sea Shield/Sea Basing pillars and to operate within the FORCEnet architecture.

Status
TCS restructure was completed in order to comply with FY 2004 congressional language. The program meets congressional direction to achieve standards-based interoperability and support Navy UAS requirements. TCS continues development of an architecture that includes the following capabilities:

- **Standards based implementation.**
- **Incorporation of NATO STANAG 4586 for interoperability**
- **VTUAV (Fire Scout) functionality and integration with LCS.**
  TCS will IOC with Fire Scout and LCS in FY 2008
- **Plug and play capability**

TCS flight-testing was initiated in FY 2003 and continues in conjunction with the Fire Scout Program. TCS will be integrated, tested, and fielded in accordance with the schedules of future Navy UAS programs.

Developers
System Integrator, Raytheon Systems Inc.; Falls Church, Virginia



UQQ-2 SURTASS/Low Frequency Active (LFA)

Description

The LFA system, the active adjunct to the Surveillance Towed Array Sensor System SURTASS sonar system, is capable of long-range detections of submarine and surface ship contacts. It comprises a low-frequency active sonar transmitter deployed below a SURTASS ship, with the SURTASS passive towed array acting as the receiver. Other Navy ships with towed arrays and compatible processing systems can also process the LFA signal returns in what is known as a "bi-static" mode. As a mobile system, SURTASS/LFA can be employed as a force-protection sensor wherever the force commander directs, including in forward operating areas or in support of battle group activities. A UHF SATCOM communication system provides direct voice and data connectivity between the SURTASS/LFA ship and tactical platforms. Two LFA systems exist, installed onboard USNS Impeccable (T-23) and the leased R/V Cory Chouest. Development continues for future LFA-type active systems employing smaller, lighter sources.

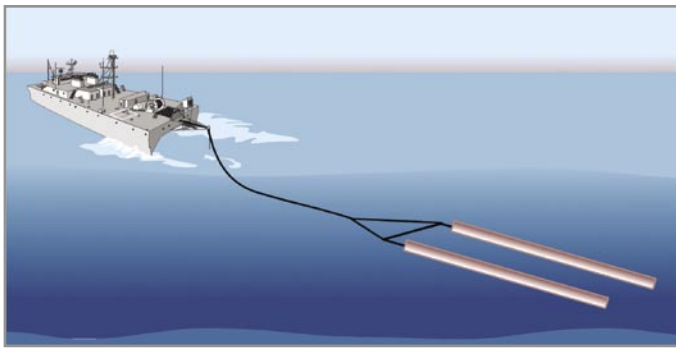
Status

SURTASS LFA was successfully reintroduced to the fleet in January 2003 following a five-year hiatus for completion of the Environmental Impact Statement (EIS) process. In October 2003 a Federal District Court enjoined testing and training with LFA for violation of the procedural requirements of the Marine Mammal Protection Act, Endangered Species Act, and National Environmental Policy Act, notwithstanding the court's finding that a national security need existed for employment of LFA and commended the Navy for the breadth of scientific research supporting the EIS. Subject to this injunction, LFA may conduct operations in certain areas within the Philippine Sea, East China Sea, South China Sea, and the Sea of Japan. The Navy released a Draft Supplemental Environmental Impact Statement (DSEIS) in the first quarter of FY2006. This DSEIS will address legislative changes to the Marine Mammal Protection Act and pertinent deficiencies raised by the District Court. The final SEIS is scheduled to be released in the third quarter of FY 2006. Currently the program consists of the USNS *Impeccable* (T-23) and one leased vessel R/V Cory Chouest.

Developers

General Dynamics Advanced Information Systems;
Anaheim Hills, California
BAE Systems; Manchester, New Hampshire
Alpha Marine; Galliano, Louisiana
Lockheed Martin Naval Electronics & Surveillance Systems;
Manassas, Virginia and Syracuse, New York

UQQ-2 Surveillance Towed Array Sensor System (SURTASS)



Description

The SURTASS capability consists of a mobile fleet of five ships that employ the fleet's most capable deep and shallow water (littoral zone) passive-acoustic towed-array sonar systems. These ships provide passive detection of quiet nuclear and diesel submarines and real-time reporting of surveillance information to theater commanders and operational units. SURTASS employs either a long-line passive-sonar acoustic array or a shorter twinline passive-sonar acoustic array. The twin-line system is the best operational shallow water towed array and the only multi-line towed array in the Navy. It consists of a pair of arrays towed side-by- side from a SURTASS ship and offers significant advantages for undersea surveillance operations in the littoral zone. It can be towed in water as shallow as 180 feet, provides significant directional noise rejection, offers bearing ambiguity solution without turning, allows the ship to tow at higher speed, and results in a shorter time to stabilize the array after a turn.

Status

Five SURTASS vessels are operational in the Pacific Fleet. The first production model TB-29A twin-line SURTASS array was installed in FY 2005, and four SURTASS vessels will have TB-29A twin line arrays by FY 2007. SURTASS is also being upgraded with the Integrated Common Processor (ICP) that will result in increased operator proficiency, increased functionality and savings in Logistics Support and Software Maintenance.

Developers

Lockheed Martin; Syracuse, New York
Lockheed Martin; Manassas, Virginia
BAE Systems; Manchester, New Hampshire
General Dynamics Advanced Information Systems;
Anaheim Hills, California
Alpha Marine; Galliano, Louisiana

S-Band Volume Search Radar (VSR)

Description

The Volume Search Radar (VSR) is an S-band active phased array radar designed to meet all above-horizon detection and tracking requirements for the 21st Century ships without area air-defense missions, specifically DD(X) and CVN 21. VSR will provide long-range situational awareness with above-horizon detection and air control (marshalling) functionality, replacing the functionality of today's SPS-48E and SPS-49 radars. A non-rotating phased array, VSR provides the required track revisit times to deal with fast, low/small, and high-diving missile threats, providing cueing for the SPY-3 Multi-Function Radar (MFR) to conduct required tracking and fire control functions above the horizon.

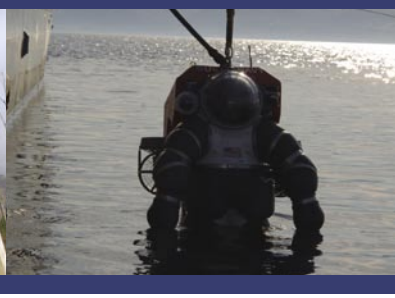
Status

Engineering and Manufacturing Development unit build is underway for development, testing, and follow-on production of VSR to support equipment delivery schedules for DD(X) and CVN 21. VSR will be fielded as an integrated radar with the SPY-3 MFR, together referred to as the Dual-Band Radar Suite (DBRS). The VSR Engineering Development Model will be tested at Wallops Island Test Facility in FY 2006. OPEVAL will occur with DD(X) testing. IOC for the DBRS is expected to be 2013.

Developers

Northrop Grumman Ship Systems (Prime);
Pascagoula, Mississippi
Raytheon Electronic Systems (Subcontractor-VSR);
Sudbury, Massachusetts
Lockheed-Martin Maritime Sensors & Systems
(Subcontractor to Raytheon-VSR Antenna System);
Moorestown, New Jersey





Sea Base

PLATFORMS
AIRCRAFT

C-37 Executive Transport

Description
The Navy maintains executive transport airlift to support the Navy Departments' DoD Directive 4500.43 designated "required users." Required users must use non-commercial air transport and have specified needs for secure communications and security. The airlift is currently provided by two C-37s (Gulfstream V/550), two C-20Ds (Gulfstream III) aircraft, one C-20A, and one VP-3A Orion. The VP-3A Orion, already at the end of its service life, is being operated on waivers and will be retired. The C-37 Gulfstream V aircraft will eventually replace the VP-3A, substantially lowering operating costs. The C-37 meets all known ICAO-imposed Air Traffic Management communications, navigation, and surveillance requirements through FY 2007.

Status
Congress funded the first C-37 in FY 2001. A second aircraft was procured in FY 2004, and two more placed on contract in 2005 (one was a Congressional add). The Navy intends to procure a fifth aircraft in the FYDP. The first aircraft was delivered to the Navy in August 2002 and is based in NAF Washington, D.C. The second C-37 arrived in February 2005 and is also based in NAF Washington, D.C. Additionally, the Navy acquired a surplus C-20A in order to meet CNE executive transportation requirements from February 2004 until delivery of the fifth C-37 in FY 2011. The Navy is using standard commercial practices to acquire the C-37, which is maintained under full civilian contractor logistics support and warranty—20 years for airframe, five years for engines, and six years for the auxiliary power unit.

Developers
Gulfstream (Division of General Dynamics); Savannah, Georgia

C-40A Clipper

Description

The Naval Air Force Reserve provides 100 percent of the Navy's organic intra-theater logistics airlift capability-Navy Unique Fleet Essential Airlift (NUFEA). NUFEA provides Navy Combatant Commanders with short-notice, fast response intra-theater logistics support for naval power projection worldwide. Seventeen remaining C-9 aircraft, which currently perform the majority of these services, are being replaced by the C-40A Clipper, a modified Boeing 737-700 series aircraft. This state-of-the-art aircraft can transport 121 passengers (passenger configuration), 40,000 pounds of cargo (cargo configuration), or a combination of the two (combination configuration), at ranges greater than 3,000 miles at Mach 0.8 cruise speed. The ability to simultaneously carry cargo pallets and passengers maximizes operational capability, safety, and capacity. C-40A features include a new wing with an advanced-technology airfoil; an electronic flight deck fully compliant with future communications, navigation, and air traffic control architectures; advanced-technology Stage III noise-compliant, fuel-efficient engines; and an integral cargo door/cargo handling system. Maximum gross take-off weight is 171,000 pounds. Until reaching the C-40 aircraft inventory objective, C-9 aircraft will need Communication/Navigation System (CNS) updates in order to comply with Global Air Traffic Management/International Country requirements.

Status

There are currently nine aircraft in inventory. The Navy is purchasing the aircraft using standard best commercial practices and seven more aircraft are currently planned across the FYDP. Three aircraft are stationed in Fort Worth, Texas; Jacksonville, Florida; and San Diego, California. Three aircraft will be stationed in North Island, California, as it becomes the third C-40 base with a projected transition completion date this year.

Developers

Boeing; Seattle, Washington

CH-53K Heavy Lift Replacement (HLR)

Description

The CH-53K is the planned follow on to the Marine Corps CH-53E Heavy Lift Helicopter. Major systems improvements of the newly manufactured helicopter will include larger and more capable engines, expanded gross weight airframe, drive train, advanced composite rotor blades, modern interoperable cockpit, external and internal cargo handling systems, and survivability. The CH-53K will be capable of externally lifting 27,000 pounds on a "Sea Level Hot" day (103° Fahrenheit) to a range of 110 nautical miles and dropping this cargo in a landing zone at a pressure altitude of 3,000 feet at 91.5 degrees Fahrenheit, a capability improvement that more than doubles the current CH-53E abilities under the same conditions. Additionally, the CH-53K will be capable of carrying a normal load of 32 combat loaded troops, with a maximum capacity of 48 troops. The CH-53K supports the Joint Operations Concept of Full Spectrum Dominance, and *Sea Power 21* by enabling rapid, decisive operations and the early termination of conflict by projecting and sustaining forces to distant anti-access, area-denial environments. Expeditionary Maneuver Warfare (EMW) establishes the basis for the organization, deployment, and employment of the Marine Corps to conduct maneuver warfare and provides the doctrine to make Joint and Multinational operations possible. EMW operational concepts include Operational Maneuver From the Sea (OMFTS), Forcible Entry Operations, Sustained Operations Ashore (SOA), and Other Expeditionary Operations (OEO). Under these supporting concepts, there is a continuing need for a heavy-lift capability to support sea-based expeditionary operations. The current Marine Corps heavy-lift aircraft, the CH-53E (designed in the 1960s and introduced in 1980 as an engineering change proposal to the CH-53D), has subsequently developed significant fatigue life, interoperability, maintenance supportability, and performance degradation concerns. In order to support the MAGTF and the JTF in the 21st Century Joint environment, an improved CH-53 is required to maintain the Marine Corps' heavy-lift capability through the year 2025 and beyond. This aircraft must provide improvements in operational capability, interoperability, reliability, and maintainability, while reducing total ownership costs.

Status

CH-53K ORD approved by JROC Memo dated 9 December 2004. Milestone B Defense Acquisition Board was held on 31 October 2005. Program has been approved for entry into MS B System Development and Demonstration and has been designated an ACAT 1D. SDD contract award is planned for March 2006 and an IOC is planned for FY 2015. Once in full-rate production, the aircraft procurement rate will ramp-up to approximately 24 aircraft per year by FY 2015 The Marine Corps requirement is estimated at 156 aircraft; however, a planned DoN Sea Basing Requirements Study will Subsequently validate the procurement objective.

Developers

Sikorsky Aircraft Corporation; Stratford, Connecticut

KC-130J Hercules Tactical Tanker and Transport

Description

The KC-130 is a four-engine turbo-prop, multi-role, multi-mission tactical aerial refueler and tactical transport aircraft that supports all six functions of Marine Aviation and is well suited to meet the mission needs of the forward-deployed MAGTF. The Hercules is the only long-range assault support capability organic to the Marine Corps. This aircraft provides fixed-wing, rotary-wing, and tilt-rotor tactical in-flight refueling; rapid ground refueling of aircraft and tactical vehicles; assault air transport of air-landed or air-delivered personnel, supplies, and equipment; command-and-control augmentation; battlefield illumination; tactical aero medical evacuation; and combat search and rescue support. The KC-130J, with its increase in speed, altitude, range, performance, state-of-the-art flight station (which includes two head up displays (HUDs), night vision lighting, an augmented crew station, fully integrated digital avionics), enhanced air-to-air refueling capability, and aircraft survivability enhancements provides the MAGTF commander with multi-mission capabilities well into the 21st Century. An Allison AE2100D3 propulsion system with full-authority digital electronic control (FADEC), Dowty R391 advanced technology six-bladed propeller system, and a 250-knot cargo ramp and door capability completes the package.

Status

The KC-130F and KC-130R have been the workhorses for assault support for the past 40 years. The KC-130J builds on this success and adds greater flexibility. This aircraft can be configured for cargo missions without losing the ability to conduct air refueling, or, if the mission dictates, it can be configured exclusively for refueling by adding an internal fuel tank. Additionally, the KC-130J can be used as a platform for the establishment of a Forward Arming and Refueling Point (FARP). The KC-130J provides increased reliability, capability and mission flexibility with its satellite communications system, survivability enhancements, night systems, and enhanced aircraft systems. The core of the improved communications suite is the ARC-210 radio, which provides UHF and VHF anti-jamming features (HAVEQUICK and SINCGARS), as well as SATCOM. All radios are also enabled for encrypted communication. As a result, the KC-130J is capable of communicating with land, naval, and air forces of all Joint and Coalition services, further extending the capability of the MAGTF. The KC-130J also possesses an improved navigation suite consisting of dual INS and dual GPS, improved radar providing for weather and ground mapping modes, and a digitally displayed moving map.

Developers

Lockheed Martin; Marietta, Georgia

MV-22 Osprey Joint Advanced Vertical Aircraft

Description

The MV-22 Osprey is a tilt-rotor, Vertical/Short Take-Off or Landing (V/STOL) aircraft designed as the medium-lift replacement for the Vietnam-era CH-46E and CH-53D helicopters. The MV-22 design incorporates advanced technologies in composite materials, survivability, airfoil design, fly-by-wire controls, digital avionics and manufacturing. The MV-22 is capable of carrying 24 combat-equipped Marines or a 10,000-pound external load, and has a strategic self-deployment capability of 2,100 nautical miles with a single aerial refueling. It is superior to the CH-46E it replaces—twice the speed, three times the payload, and six times the range. The MV-22's 38-foot proprotor system and engine/transmission nacelle mounted on each wingtip allow it to operate as a helicopter for take-off and landing. Once airborne the nacelles rotate forward 90 degrees, transitioning the MV-22 into a high-speed (ca. 250 knots), high-altitude (ca. 25,000 feet), fuel-efficient turboprop aircraft. The MV-22 represents a revolutionary change in aircraft capability to meet expeditionary mobility needs for the 21st Century. A Special Operation Forces (SOF) variant, the CV 22, is under concurrent development.

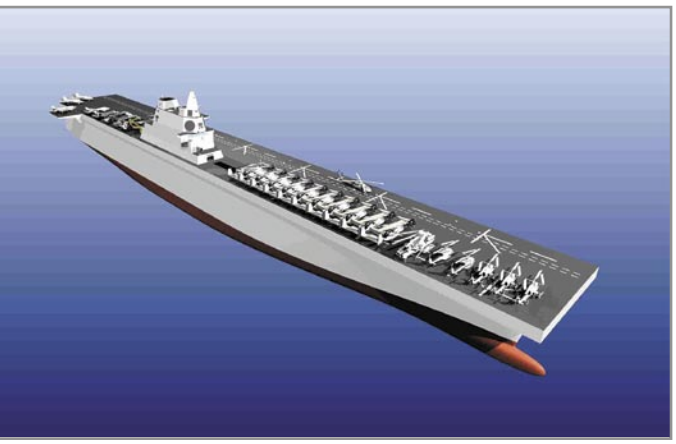
Status

The V-22 completed its Operational Evaluation (OPEVAL) in June 2005 and was found to be Operationally Suitable and Operationally Effective. The aircraft was subsequently approved for Milestone III and full-rate production in September 2005. The FY 2006 budget contains nine MV-22s and two CV 22s. Once in full-rate production, the aircraft procurement rate will ramp-up to approximately 48 MV/CV aircraft per year. Negotiations are underway to secure a multi-year contract with Bell-Boeing for the period FY 2008-FY 2012. The program of record includes 360 MV-22s for the Marine Corps, 50 CV 22s for USSOCOM, and 48 MV-22s for the Navy, for a total of 458 V-22 aircraft.

HMM-263 retired as a CH-46E squadron and entered the transition on 3 June 2005 to become the first operational VMM squadron (VMM-263). VMM-263 will deliver the IOC of the MV-22 Block B in 2007. The first block B aircraft was delivered on 8 December 2005.

Developers

Bell Helicopter Textron; Fort Worth, Texas
Boeing Defense and Space Group, Helicopter Division; Philadelphia, Pennsylvania
Rolls Royce; Indianapolis, Indiana



SURFACE AND EXPEDITIONARY WARFARE SHIPS AND CRAFT

LHA(R) General Purpose Amphibious Assault Ship (Replacement)

Description

The LHA(R) is a new acquisition program that will deliver a class of general-purpose amphibious assault ships. In support of the *Sea Power 21* global concept of operations, the LHA(R) class will provide forward-presence and power-projection capabilities as elements of U.S. expeditionary strike groups and strike forces. With elements of a Marine landing force, the LHA(R)-class will embark, deploy, land, control, support, and operate helicopters, landing craft, and amphibious vehicles for sustained periods. The LHA(R) will also support contingency-response, forcible-entry, and power-projection operations as an integral part of joint, interagency, and multinational maritime expeditionary forces. Based on evolutionary spiral development strategy that leverages evolving technologies and systems, the LHA(R)-class will replace four of the five *Tarawa* (LHA-1)-class that begin reaching the end of their expected service lives between 2011 and 2015. LHD 8, the final ship of the *Wasp* (LHD 1)-class will replace the first retiring *Tarawa*-class ship and will incorporate a gas turbine propulsion plant and all-electric auxiliaries. The first LHA replacement is being designed as a variant of the LHD 8. This ship will include LHD 8 enhancements (see the LHD 1 program summary) and a significant increase in aviation lift, sustainment, and maintenance capabilities; space for a MEB, PHIBGRU, or small-scale JTF staff; a dramatic increase in service life allowances for new-generation Marine Corps systems (MV-22, JSF); and substantial survivability upgrades.

Status

In 1999, the Navy conducted a development of options study that ruled out LHA Service Life Extension as a viable option. The Navy and Joint Staff approved and validated the LHA(R) Mission Needs Statement in March 2001, and OSD (AT&L) authorized Milestone A Acquisition Status and entry into Concept Exploration phase in July 2001. Under OSD guidance, the Navy conducted an analysis of alternatives to determine the best method of replacing the four remaining LHAs. This study, completed in September 2002, evaluated numerous design alternatives, including: (1) repeat LHD 8 with evolutionary modifications; (2) a longer and wider LHD 8 upgraded to operate the larger and heavier new-generation amphibious systems; and (3) several new ship designs spanning a wide range in size and capability. The Navy and Marine Corps leadership determined a modified LHD with greater aviation focus, including aviation facility enhancements in lieu of a well deck, provided the best balance of affordability, timing, and capability. JROC approval was obtained in February 2005 and Milestone B was reached in January 2006. The first LHA(R) was designated LHA 6 by the Under Secretary of the Navy in August 2005 with

hull numbers for subsequent ships in the LHA(R) program following sequentially. LHA 6 is planned for a FY 2007 contract award and delivery in FY 2012.

Developers
To be determined.

Joint High Speed Vessel (JHSV)

Description
The JHSV is an intra-theater lift capability prototyped by leased vessels such as Joint *Venture* (HSV-X1), *Swift* (HSV-2), and *WestPac* Express. These vessels have demonstrated the ability to rapidly embark and transport combat forces during Advanced Concept Technology Demonstration (ACTD) testing. In addition, they have participated in exercises and operations around the globe, including *Swift*'s deployment as part of Tsunami Relief and Hurricane Katrina disaster relief operations. JHSV is not an assault platform, but provides intra-theater lift capability for company-sized units, including personnel, equipment and supplies, in support of the Global War on Terrorism and theater security cooperation plans (TSCP).

Design and cost analysis of the JHSV is ongoing, but the leased vessels are capable of speeds in excess of 40 knots and ranges greater than 1,200 nautical miles fully loaded. In addition, the shallow draft characteristics enable them to operate effectively in littoral areas and access small, austere ports. Potential capabilities being evaluated, as part of the AoA, include some medical, command and control, and underway logistics support enhancements, as well as launch and recovery of MH-60S helicopters, rigid hull inflatable boats, and unmanned off-board vehicles.

Status
The JHSV program was formed by a merger of the Army Theater Support Vessel (TSV) and Naval High Speed Connector (HSC) programs to maximize common capabilities and form a joint platform solution. Navy has been designated the lead DOD component. The Initial Capabilities Document (ICD) was JROC approved in November 2005 and the AoA is expected to be completed late in 2005.

Developers
To be determined.

Landing Craft, Air Cushion (LCAC)

Description

This high-speed, fully amphibious landing craft is capable of carrying a 60-ton payload (75 tons in overload) at speeds in excess of 40 knots and a nominal range of 200 nautical miles. Its ability to ride on a cushion of air allows it to operate directly from the well decks of amphibious warships. Carrying equipment, troops, and supplies, the LCAC launches from the well deck, transits at high speed, traverses the surf zone and lands at a suitable place ashore where it quickly offloads and returns to amphibious shipping for follow-on sorties. LCACs provide Amphibious Task Force commanders flexibility in selecting landing sites, permitting access to more than 70 percent of the world's shores as compared with 17 percent for conventional landing craft. LCACs deliver vehicles and cargo directly onto dry land rather than in the surf zone, and have proved invaluable in support of Humanitarian Assistance/ Disaster Relief (HA/DR) missions including Tsunami Relief and Hurricane Katrina. LCACs are multi-mission craft that could also conduct alternate missions when outfitted with appropriate mission packages. A Service Life Extension Program (SLEP) to extend hull life from 20 to 30 years for 73 of the 82 active LCACs will be accomplished through FY 2017. Newer craft are being outfitted with C4I (radar and radios) system upgrades prior to entry into SLEP. As part of SLEP, the Navy will incorporate the following life enhancements:

- **An open-architecture concept, relying on modern commercial-off-the-shelf (COTS) equipment that will allow much easier incorporation of later technology changes, such as the precision navigation system and communications systems, fully interoperable with in-service and near-term future joint systems now planned;**
- **Engine upgrades (ETF-40B configuration) that will provide additional power and lift, particularly in hot (100° Fahrenheit and higher) environments, reduced fuel consumption, reduced maintenance needs, and reduced lift footprint;**
- **Refurbishment of the buoyancy box and some of the rotating machinery in order to solve corrosion problems, incorporate hull improvements, and "reset" the fatigue-limit "clock"; and**
- **Incorporation of a new (deep) skirt that will reduce drag, increase performance envelope over water and land, and reduce maintenance requirements.**

Status

IOC was achieved in 1986. Contracts for 91 LCACs were approved through FY 1997, with all 91 craft delivered to the fleet by the end of 2000. Nine that were in Deep Reduced Operating Status (03ROS) are being terminated in FY 2006 for cost reasons, and two are held for R&D. The LCAC SLEP began in late 2000. Six SLEPs are planned each year FY 2006-FY 2014.

Developers
Textron Marine and Land Systems; New Orleans, Louisiana
Avondale Marine; Gulfport, Mississippi

Seabase to Shore Connector (SSC), LCAC Replacement

Description
The SSC is envisioned to provide high-speed, heavy-lift for over-the-horizon maneuver, surface lift, and shipping. The LCAC SLEP (see LCAC program summary) is capable of lifting 72 tons (75 in overload) in extreme environmental conditions. The SSC is expected to carry up to 144 tons, thus increasing capacity while reducing manning requirements. One candidate solution would be up to 50 percent longer than the LCAC, with enhanced lift fans and propellers and composite materials technology. These design goals, if realized, would allow the SSC a 100 percent load capacity increase in armored combat vehicles (tanks and light armored vehicles) and heavy logistics loads. Engineering and cost analysis must be conducted to determine whether this candidate is a feasible solution.

Status
The Initial Capabilities Document (ICD) is anticipated to be completed in FY 2006. Research, Development, Test and Evaluation (RDT&E), including the AoA, will begin in FY 2006, and Fleet Introduction of the first craft is anticipated to occur in the FY 2015-2016 time period.

Developers
To be determined.

LHD Wasp-Class Amphibious Assault Ship

Description
The *Wasp* (LHD 1)-class comprises eight 40,650-ton full-load, multi-purpose amphibious assault ships whose primary mission is to provide embarked commanders with command and control capabilities for sea-based maneuver/assault operations as well as employing elements of a landing force through a combination of helicopters and amphibious vehicles. The *Wasp*-class also has several secondary missions, including power projection and sea control. The LHD 1 ships increase total lift capacity by providing both a flight deck for helicopters and Vertical/Short Take-Off or Landing (V/STOL) aircraft, such as the AV-8B Harrier and the MV-22 Osprey, and a well deck for both air-cushioned and conventional landing craft. Each ship can embark 1,877 troops (surge) and has 125,000 cubic feet of cargo for stores and ammunition and 20,900 square feet for vehicles. Medical facilities include six operating rooms, an intensive-care unit, and a 47-bed ward. LHDs 5-7 are modified variants of the class, and design changes include: increased JP-5 fuel capacity, C4ISR and self-defense improvements, fire-fighting and damage-control enhancements, and Women-at-Sea accommodations. The Navy awarded the LHD 8 construction contract in April 2002. The ship has significant design changes that

incorporate gas-turbine (GT) propulsion and all-electric auxiliary equipment. GT propulsion was considered for LHD 5 (keel laid in April 1991), but the technology of the time would have required four GT plants that would have significantly reduced internal volume for other vital needs. Since then, GT power-ratings have increased such that just two GTs are needed to generate the required 70,000 shaft-horsepower (the earlier ships have two steam plants and geared turbines). Otherwise, LHD 8 will be a modified-repeat of LHD 7 (a state-of-the-practice ship), except for changes made necessary because some older systems are no longer available.

Status

Seven LHDs have been delivered to the Fleet. The newest LHD, the USS *Iwo Jima* (LHD 7), was commissioned on 30 June 2001. The eighth ship of the class, USS *Makin Island* (LHD 8) is under contract, and the Navy anticipates delivery of the ship in FY 2007.

Developers

Northrop Grumman Ship Systems; Pascagoula, Mississippi

LPD 17 San Antonio-Class Amphibious Transport Dock Ship

Description

The *San Antonio* (LPD 17)-class is an amphibious transport dock ship optimized for operational flexibility and designed to meet MAGTF lift requirements in the emerging Expeditionary Maneuver Warfare concept of operations. The *San Antonio*-class is 684 feet in length, with a beam of 105 feet, a maximum displacement of 25,000 long tons, and a crew of approximately 360. Four turbocharged diesels with two shafts and two outboard-rotating controllable-pitch propellers will generate a sustained speed of 22-plus knots. Other ship characteristics include 25,000 square feet of space for vehicles (more than twice that of the *Austin* (LPD 4)-class), 34,000 cubic feet for cargo, accommodations for approximately 720 troops (800 surge), and a medical facility (24 beds and four operating rooms-two medical and two dental). The aft well deck can launch and recover traditional surface assault craft as well as two landing craft air cushion (LCAC) vehicles, capable of transporting cargo, personnel, Marine vehicles, and tanks, and the Marine Corps' new Expeditionary Fighting Vehicle (EFV). The LPD 17 aviation facilities include a hangar and flight deck (33 percent larger than *Austin*-class) in order to operate and maintain a variety of aircraft, including current and future rotary-wing aircraft. Other advanced features include the Advance Enclosed Mast/Sensor (AEM/S) for reduced signature/sensor maintenance, reduced-signature composite-material enclosed masts, other stealth enhancements, state-of-the-art C4ISR and self-defense systems, a Shipboard Wide-Area Network (SWAN) that will link shipboard systems and embarked Marine Corps platforms, and significant quality of life improvements.

Reducing Total Ownership Costs (TOC) has been and will remain an important factor in the program's efforts. By introducing

a variety of new approaches to streamlining the acquisition process and taking advantage of numerous "SmartShip" initiatives to optimize (not simply reduce) manning through focused human-factors engineering and thus enhance operational capabilities, the Navy estimates that it shaved about $4.5 billion from the program's TOC. Manning and human-systems integration issues are absolutely essential, as some approximately 40 percent of a ship's life cycle, cradle-to-grave cost is directly linked to its crew.

With the *Tarawa* (LHA-1)-class, *Wasp* (LHD 1)-class, LHA Replacement [LHA(R)]-class amphibious assault ships, and the 12 LSDs; the Navy has the foundation for lifting both the Marine Expeditionary Brigade Assault Echelons (MEB AE) and to sustain the forward deployments of three Marine Expeditionary Units (special operations capable) (MEU SOC).

Status

The initial contract award to design and build the lead ship of the class was awarded to the Avondale-Bath Alliance in December 1996. A contract award protest was successfully resolved in April 1997. LPD 17 class workload was transferred from Bath Iron Works to Northrop Grumman Ship Systems (NGSS) in June 2002. LPDs 17 through 21 are under construction:

> ***San Antonio*** **(LPD 17), was delivered in July 2005 and was commissioned in January 2006.**

> ***New Orleans*** **(LPD 18), started construction in February 2002, and was delivered in December 2005.**

> ***Mesa Verde*** **(LPD 19), started construction at NGSS Pascagoula in August 2002, and is expected to deliver in 2006.**

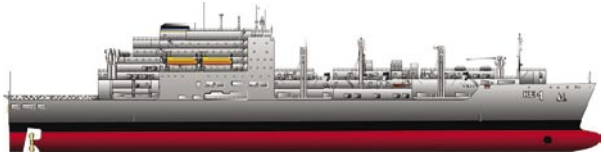
> ***Green Bay*** **(LPD 20), started construction in March 2003 and is expected to deliver in 2007.**

> ***New York*** **(LPD 21), started construction in March 2004 and is expected to deliver in 2008.**

Contract negotiations for *San Diego* (LPD 22) and *Anchorage* (LPD 23), and LPD 24 are ongoing. LPD 24 and LPD 25 are named *Arlington* and *Somerset* respectively to honor the heroes and victims of the 11 September 2001 Pentagon attack and the flight downed in Pennsylvania.

Developers

Northrop Grumman Ship Systems Avondale Operations;
New Orleans, Louisiana
Ingalls Operations; Pascagoula, Mississippi
Raytheon; San Diego, California
Intergraph; Huntsville, Alabama



MPF(F) Maritime Prepositioning Force (Future)

Description

Current MPF ships have limited interoperability with naval shipping and cannot provide direct and continuous sustainment after ship-offload. Today's MPF ships offload at a port or across a beach, and equipment is married with Fly-in Echelon (FIE) personnel and equipment from shore based Marine Expeditionary Units or Brigades (MEUs/MEBs). In order to meet future *Sea Power 21* sea-basing needs, SECNAV selected a hybrid MPF(F) squadron on 24 May 2005. The squadron is comprised of three large deck amphibious ships, six cargo ships, three new design "float-on/float-off" ships, two LHA(R)s, 1 LHD, three LMSRs, three T-AKEs, three Mobile Landing Platforms (MLPs) and two legacy Maritime Prepositioning ships. Compared to the current MPF fleet, the MPF (F) squadron will have additional capabilities to satisfy ship-to-objective-maneuver (STOM) and operational maneuver... from the sea (OMFTS) mission requirements, including:

- **Selective off-load, which will enable Marine Expeditionary Brigades to select equipment tailored for specific STOM and OMFTS missions**
- **The ability to form a Maritime Prepositioning Group (MPG) as part of the Sea Base in support of expeditionary and carrier strike group operations**
- **The capability to provide joint sustainment in direct support of joint forces tasked with STOM and OMFTS tasks**
- **The capability to reconstitute in the Joint Operations Area (JOA) and to redeploy directly to another JOA**
- **MPF(F)s will provide operational and logistical support from the sea for Marines and joint forces ashore as well as naval forces afloat. Optimizing sea-based capabilities will significantly reduce assured-access and sovereignty challenges by reducing footprint ashore.**

MPF(F)s will transform the MPS-supported Marine Expeditionary Brigade from a fighting unit effective ashore to one that can operate continuously from a sea base without the need to transition support elements to land. MPF(F) will also support rapid reconstitution and redeployment for follow-on missions.

MPF(F)'s transformational characteristics include significant improvements in force closure, sustainment, selective offload, command and control, and reconstitution. MPF(F) will be interoperable with current amphibious task force shipping via surface transport (LCAC), underway replenishment stations, and compatible C4I systems. MPF(F) has the potential to support joint operations and will be interoperable with joint forces support capabilities. MPF(F) will transform naval logistics into a seamless and integrated system that will complement current Combat Logistics Forces by providing sea-based logistics to all naval forces. This ability could include cargo transshipment from intermodal shipping to other naval ships or ashore. While independent forcible entry is not a mission envisioned, MPF(F) will be able to

directly support a committed expeditionary strike group and apply forces directly where required.

Status
The MPF (F) Capabilities Description Document (CDD) is in the final stages of draft, and intended for submittal into the formal Joint Capability and Integration Development System (JCIDS) in January 2006. Detailed studies are concurrently underway, supporting CDD development survivability, logistics concepts of operations, sustainment, and more. Every effort is being made to ensure the Navy/Marine Corps team delivers this on time as global requirements for access, speed, and persistence continue to mount. Award of the lead ship contract is expected in FY 2009 (with advance procurement in FY 2008). This schedule will provide for a squadron initial operational capability in FY2020.

Developers
To be determined.

EQUIPMENT AND MATERIAL

Cargo Offload and Discharge System (COLDS)

Description
The COLDS includes the Cargo Offload and Transfer System (COTS) for dry cargo and the Offshore Bulk Fuel System (OBFS) for liquid cargo. COLDS supports Logistics-Over-The-Shore (LOTS) operations-the loading and unloading of Marine Corps Maritime Pre-positioning Force (MPF) and Assault Follow-On Echelon (AFOE) ships-in the absence of established port facilities.

Status
Routine replacement of these assets maintains LOTS readiness. After the Army withdrew from development and acquisition of a sea-state-three-capable Joint Modular Lighterage System (JMLS), the Navy leveraged research and development technology from the JMLS program to procure a replacement system called the Improved Navy Lighterage System (INLS) which is required to replace less capable assets that have reached the end of their service life. This system will support current near shore MPF operations, but is not envisioned as the delivery vehicle for MPF Future assets. Ongoing research and development efforts (i.e., shipboard cranes) will provide increased operational LOTS capability. Prototype testing on INLS and associated subsystems was completed in FY 2003. The Navy awarded the contract for INLS low-rate production in FY 2003. Delivery was in October 2005 and is currently undergoing Developmental Testing through March 2006. Operation Evaluation Testing (OPEVAL) is scheduled to begin April 2006 and full-rate production will begin at the conclusion of OPEVAL, around May/June 2006. Fielding to MPF will begin in FY 2007.

Developers
Marinette Marine; Marinette, Wisconsin
Oldenburg; Lakeshore, Wisconsin

Naval Mobile Construction Battalion (NMCB) Tables of Allowance (ToA)

Description

Naval Construction Force elements provide engineering and combat construction support to MAGTF. In support of Sea Strike and Sea Basing missions, the Navy/Marine Corps Team projects power from the sea with a rapid flow of maneuver forces ashore, using roads, expeditionary airfields, force-protection structures, intermediate staging bases, and advanced logistics bases. Forward deployment of NMCBs enables the surge of task-tailored engineer forces and equipment sets to enhance the MAGTF and other naval and joint forces on land. In operations other than war, forward-deployed NMCBs hone construction skills through humanitarian assistance and disaster-recovery operations, participate in foreign engagement exercises, and complete construction projects that support sustainment, restoration, and modernization of the Navy's forward bases and facilities.

Status

The Navy has developed a long-range plan to recapitalize the Tables of Allowance (ToA) of all Seabee units. The initial priority is to correct existing inventory deficiencies and replace aging tools and equipment that are no longer parts supportable. During the next several years, the ToAs will be outfitted with modern and recapitalized tactical vehicles, construction and maintenance equipment, communications gear, infantry items, and field support equipment.

Developers

Multiple sources.

SUBMARINE ESCAPE AND RESCUE

Survivability

Description
Today's submarine Sailors use passive means to remove carbon dioxide from a disabled submarine's atmosphere, enabling survival up to seven days. Current development includes improving passive scrubbing capability and more accurately monitoring a disabled submarines atmosphere.

Status
Installation of passive scrubbing curtains onboard all submarines is nearing completion. Procurement and installation of SUB MKII Phyperbaric analyzers onboard all submarines has just commenced.

Developers
Battelle Memorial Institute; Columbus, Ohio
Analox Sensor Technology; Stokesley, United Kingdom

Escape (SEIE)

Description
To facilitate emergency escape from depths down to 600 feet, all submarines are being outfitted with the Mark 10 Submarine Escape Immersion Equipment (SEIE) suit and improved hatch operating systems. In addition to increasing the depth capabilities of escape, the suit provides thermal protection and individual life rafts for surface abandonment or escape.

Status
Installation nears completion for the 688-class, while the installations for the 726-and 21-class begin in early 2006. The 774-class is receiving SEIE suits upon initial outfitting following construction.

Developers
Beaufort Air-Sea Equipment; Merseyside, United Kingdom

Rescue (DSRV, SRC, SRDRS)

Description

The Navy's Deep Submergence Rescue Vehicle (DSRV) and Submarine Rescue Chamber (SRC) provide the service's current capabilities for submarine rescue. These systems are designed for quick deployment in the event of a submarine accident. They are transportable by truck, aircraft, ship, and, for the DSRV, by specially configured "mother" submarines. The Navy is developing a new rescue system called the Submarine Rescue Diving Recompression System (SRDRS). SRDRS is a manned submersible capable of rapid, worldwide deployment on vessels of opportunity. The SRDRS overcomes a significant deficiency of current systems enabling personnel transfer under pressure and decompression for submarine disaster survivors. SRDRS will be a government-owned government/contractor-operated system, and will provide increased capability at reduced costs compared to legacy rescue systems.

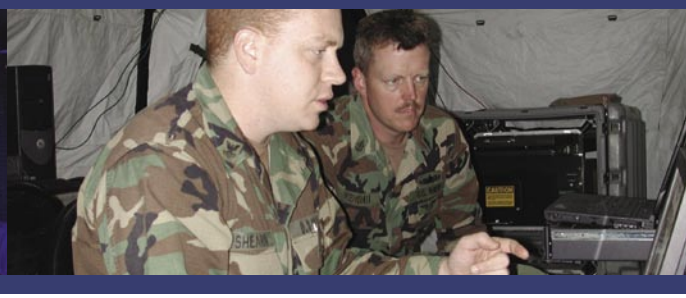
Status

Critical design review for the SRDRS rescue vehicle is completed for the pressurized rescue module and it is in production. The SRDRS is scheduled to be rescue-ready to replace the DSRV in FY 2007, with a transfer under pressure capability introduced in FY 2009.

Developers

OceanWorks International; Vancouver, California
Oceaneering International; Upper Marlboro, Maryland
Southwest Research Institute; San Antonio, Texas





FORCEnet

JOINT SERVICE/NAVY-WIDE SYSTEMS

Architectures and Standards

FORCEnet is the core of *Sea Power 21* and naval transformation, and is the Navy and Marine Corps vehicle to make Net-Centric Operations/Warfare (NCO/W) an operational reality. FORCEnet is the operational construct and architectural framework that makes Sea Strike, Sea Shield, and Sea Basing possible by integrating weapons, sensors, command & control, platforms, and warriors into a secure, networked, distributed combat force as part of the Global Information Grid (GIG). FORCEnet is not an acquisition program; it is an enterprise alignment and integration initiative that serves as a change agent and a forcing function for innovation, touching every naval program. Since its inception in 2003, FORCEnet has substantially transformed the Navy and Marine Corps in both process and product. FORCEnet is being implemented in coordination with transformation initiatives in the Army, Air Force, and Coast Guard—enhancing efficiency, joint interoperability, and warfighting effectiveness.

FORCEnet is key to the Navy's strategic shift from a platform-centric to a NCO/W environment. This includes how the Navy defines future capabilities-based requirements, develops systems, and delivers combat power to the warfighter. NCO/W derives power from rapid, robust, and secure networking of well-informed, geographically dispersed warfighters that will enable an overpowering tempo and a precise, agile style of maneuver warfare. Using effects-based operations, the aim is to sustain access and decisively impact events ashore. FORCEnet develops and drives command and control doctrine and processes to make commanders at all levels more effective by enhancing efficient use of information, allowing accelerated and improved decision-making.

Toward this goal, the *FORCEnet Functional Concept* was developed jointly by Navy and Marine Corps warfighters and operators, and was approved by the Chief of Naval Operations and the Commandant of the Marine Corps in February 2005. The *FORCEnet Functional Concept* provides the joint, operational foundation for all FORCEnet requirements. It was followed in May 2005 by DCNO (Warfare Requirements and Programs) *FORCEnet Requirements/Capabilities and Compliance (FRCC) Policy*, which codified and implemented all FORCEnet requirements (including enterprise integrated architectures and standards) in the *FORCEnet*

Consolidated Compliance Checklist (FCCC) and established a supporting end-to-end compliance process. These requirements were developed in collaboration with the other Services, the Office of the Secretary of Defense, the Joint Staff, national agencies, combatant commanders, allies/coalition partners, and industry to enhance efficiency and interoperability while supporting Navy integration into the GIG. The FRCC Policy end-to-end compliance includes implementation and integration of a Fleet-led FORCEnet Enterprise Team (FET) process and an Acquisition Community-led FORCEnet Implementation Baseline (FIBL) process, thereby linking OPNAV, Fleet, and the Acquisiton Community with a single set of net-centric requirements, architectures, and standards. FORCEnet Enterprise Architecture implementation was further enhanced by the establishment in July 2005 of a Navy-Marine Corps FORCEnet Integrated Architecture Governance structure, which establishes authoritative Naval Enterprise Architecture, places architecture products into configuration management, and moves these architectures into broader DoD access on the DoD Architecture Repository System (DARS). These architectures serve as a foundation for FORCEnet capabilities that will influence our resourcing and acquisition strategies. FORCEnet Enterprise Standards have similarly been put under configuration management and are being moved into broader DoD access on the DoD Information Technology Standards Registry (DISR), with Navy participating in the DoD Information Technology Standards Council. Also in July 2005, the Assistant Secretary of the Navy (Research, Development, and Acquisition) promulgated the *DoN Policy for Acquisition Community Support to Implement FORCEnet Capabilities*, which further implements these FORCEnet requirements and integrated architectures by providing for their verification and testing in DoN acquisition programs to ensure system compliance. This will support the migration of both legacy and developing systems into a NCO/W environment while enhancing investment decisions by identifying potential duplications and gaps in warfighting capabilities

FORCEnet enhanced joint warfighting capabilities were fielded in 2003, 2004, and 2005 through the *Trident Warrior* joint operational event. *Trident Warrior* efforts in 2005 focused on enhanced allied/coalition warfighting capabilities, which will be further developed through *Trident Warrior* events in 2006 and beyond. *Trident Warrior* provides the operational crucible in which NCO/W technology and tactics are demonstrated and assessed, and warfighting requirements and operational processes are refined.

Automated Digital Network System (ADNS)

Description

The ADNS is the Tactical Internet Protocol (IP) Routing and Switching system for all Wide Area Network (WAN) IP services which connect afloat units to the various global shore sites. It provides ship and shore Internet Protocol (IP) connectivity and promotes the efficient use of available satellite and line of sight communications bandwidth. ADNS is engaged in converging all voice, video, and data communications between ship and shore to an IP medium taking full advantage of all RF means aboard ships to transmit data efficiently. Specifically, it automates the routing and switching of tactical and strategic C4I data via Transmission Control Protocol/Internet Protocol (TCP/IP) networks linking deployed battle group units with each other and with the Defense Information Systems Network (DISN) ashore. ADNS uses Commercial Off-the-Shelf (COTS) and Non-Developmental Item (NDI) Joint Tactical Architecture (JTA)-compliant hardware (routers, processors, and switches), and commercial-compliant software in a standardized, scalable, shock-qualified rack design.

Status

Three hundred and thirteen shipboard and eight shore sites (Network Operations Centers) Increment I and Increment II systems have been fielded through FY 2005. Afloat installations include amphibious ships, carriers, cruisers, command ships, destroyers, frigates, and submarines. The shore installations of multiple ADNS nodes have been fielded at the four major sites supporting Surface Ship Operations (NCTAMS LANT, EURCENT, PACIFIC, and at NCTS Bahrain) and at the four major sites supporting Submarine Afloat Communications (Broadcast Control Authority Sites at LANT, PAC, COMSUBGRU Eight in Italy, and COMSUBGRU Seven in Japan). Current FYDP plans include replacing all currently deployed systems with ADNS Systems capable of meeting Network centric, FORCEnet, and future DoD Initiatives. This will be accomplished in accordance with the fleet commanders' coordinated SHIPMAIN process. Fielding plans starting in FY 2005 include installation of ADNS Increment II. In FY 2006 ADNS Increment IIa will provide additional capability to Force level ships only. Increment III will be installed in FY 2008 with a planned IOC for late FY 2008 or early FY 2009. Increment III in alignment with the Tactical Switching program will field only two shore locations NCTAMS Lant and Pac (RNOSC East and West). Increment II, IIa, and III will replace End of Life System Hardware, eliminate the current 2 Mbps IP Throughput bandwidth bottleneck, converge all Ships Voice, Video, and data on a Dual Stack IPv4/IPv6, Cipher text, IP core network architecture.

Developers

SPAWAR Systems Center Code 2631; San Jose, California
Science Applications International Corporation;
Arlington, Virginia
Cisco; San Jose, California

Advanced Tactical Data Link Systems (ATDLS)

Description

The ATDLS program develops, fields, and supports joint and coalition Tactical Data Link (TDL) capabilities. These joint TDLS include terminals, gateways, networks, and support initiatives that improve TDL connectivity, promote equipment commonality and interoperability, and provide training and fleet support. Link-11 is used by Navy, Air Force, Army, Marine Corps, and allied ships and aircraft, many of which are also equipped with Link-16. In accordance with the Joint Tactical Data Link Management Plan (JTDLMP), Link-11, which uses the M-series message standard, is scheduled to be shut down no later than 2015. Link-16, which uses the J-series message standard, has been designated as the DoD primary Tactical Data Link. The Navy is implementing Link-16 in most of its link-capable platforms. As the JTDLMP approved replacement for Link-11, Link-22 is a multi-national development effort and will use the J-Series message standard. Major supported efforts are as follows:

- **Terminals: Joint Tactical Information Distribution System (JTIDS), Multifunctional Information Distribution System (MIDS) Low Volume Terminal (LVT), MIDS Joint Tactical Radio System (JTRS), and the Common Shipboard Data Terminal Set (CSDTS)**
- **Gateways: Command and Control Processor (C2P), Common Data Link Management System (CDLMS), Next Generation C2P, and Common Link Integration Processing (CLIP)**
- **Support Initiatives: Joint Interface Control Officer (JICO) Support System (JSS), Dynamic Network Management (DNM)**

These capabilities allow more effective employment of fleet units by improving timeliness, accuracy, and content of tactical data transfer.

Status

See following FORCEnet program descriptions on pages 130-168.

Developers

Data Link Solutions (DLS); Cedar Rapids, Iowa
ViaSat Inc.; Carlsbad, California
Advanced Programming Concepts; Austin, Texas
BAE Systems; Wayne, New Jersey

Base Level Information Infrastructure (BLII)

Description

BLII is the program of record that modernizes IT facilities at 16 OCONUS Navy bases, stations, and headquarters. It installs new, or upgrades existing infrastructure to provide state-of-the-art IT capability. Further, the program installs the hardware, software, and enterprise management tools to enable a fully integrated,

interoperable, and secure IT network for rapid and reliable transfer of data, voice, and video. The program also replaces or upgrades obsolete telephone switches at 140 CONUS and OCONUS locations. Major functional areas of BLII are:

OCONUS IT infrastructure modernization

- **Installs/modernizes base and building cable plants; WAN, BAN, and LAN electronics; information assurance; network management; configuration management; and asset management capabilities**
- **Provides engineering and operations expertise at the IT Service Centers and the IT Outreach Centers**
- **Installs and sustains system hardware, software, and related training**

OCONUS force protection (IT)

- **Installs/modernizes OCONUS pier IT infrastructure to IT-21standards (Equal to or better capability pier-side as ships had at sea)**
- **Provides engineering, operations and maintenance support to the newly installed IT infrastructure**
- **Expands SIPRNET capability at OCONUS locations**

Naval Network and Space Command (NNSOC) telephone switch replacement/modernization

- **Replaces obsolete telephone switches and upgrades firmware and software on a progressive schedule to ensure compliance with JCS directives and the recently enacted Public Law 107-314 at the 140 NNSOC telephone switch locations that service our forward deployed OCONUS and CONUS support forces**
- **Modernizes telephone switch cable plants**

Status

The backbone phase of the OCONUS IT infrastructure modernization is rapidly coming to conclusion at the 16 designated overseas fleet concentration centers. The next major phase of the OCONUS IT modernization is to bring users to the new physical infrastructure followed by the migration of these users to the new OCONUS enterprise network. Funding is in place to continue this evolution to include technical upgrades and technology insertion through FY 2011. The replacement and upgrade of the Navy's telephone switches is accomplished on a progressive and systemic schedule to meet the OSD/Joint Staff mandated timeframe.

Developers

Navy policy is to procure only hardware and software from the DISAJITC tested/certified/interoperable "Approved Products List." All hardware and software procured and installed in conjunction with the BLII POR is under the cognizance of PEO C4I and Space (PMW 790). CNO N71, NETWARCOM, and the PMW maintain close synchronization in the requirements validation, acquisition, installation, and logistics process.

Command and Control Processor (C2P)

Description

The C2P serves as the interface and the data translator between the surface platform's Combat Direction System (CDS) and the Tactical Data Links (TDL). It is considered a gateway as described in the ATDLs discussion above. It is the data forwarder between Links-11 and 16. In 1984, implementation of JTIDS/Link-16 based CDSs commenced with the Advanced Combat Direction System (ACDS) Model 5. The ACDS Model 5 contract had an option for development of a C2P to provide the functionality of the TDL Communication Processor. Also in 1984, the Operational Requirement (OR) for the C2P was established. The operating program of UYQ-62 (V), the initial C2P variant, was coded in CMS-2 and hosted in a single UYK-43. When development of ACDS Model 5 was delayed, the C2P was modified to support Model 4 (Link-11) based surface platforms. This allowed installation of C2P and JTIDS/Link-16 aboard Model 4 AEGIS and ACDS Block 0 ships. With this capability, C2P serves as a gateway to connect a Link-16 network to a legacy Link-11 network. C2P Model 4 successfully completed OPEVAL in a combined test with Link-16 in FY 1994. C2P Model 5 successfully completed OPEVAL in FY 2000. The approaching obsolescence of the C2P computer brought about the need to identify a suitable hardware set to re-host the functionality of the C2P. As a practical and cost-effective option, the C2P re-host initiative was joined with another initiative that encompassed the concept of co-locating multiple tactical link management, coordination, and monitoring in a single host.

Status

The C2P is fully fielded with the capability being re-hosted as software within the Common Data Link Management System and Next Generation C2P.

Developers

GSA/Anteon; Fairfax, Virginia
DRS Inc; Wyndmoor, Pennsylvania

Common Data Link Management System (CDLMS)

Description

The CDLMS initiative extends the functionality of the Command and Control Processor by consolidating several functions previously performed by separate systems or subsystems, and providing improved Human Machine Interface (HMI) and Link maintenance. CDLMS also incorporates the Link Monitoring System (LMS) along with supporting the initial phase of development of the Common Shipboard Data Terminal Set (CSDTS). The CSDTS initiative provides the next generation Link-11 data terminal replacing legacy Link-11 terminal hardware while incorporating Multi-Frequency Link-11 (MFL), Satellite Link-11, and supporting the initial Dual Net Link-11. Re-hosting the C2P within CDLMS provides the same functionality in COTS hardware, namely the

UYQ-70 console, which makes the system easier and less expensive to upgrade. The CDLMS integrates the CSDTS and C2P (Rehost) in a set of VME cards to provide consolidated displays and controls to monitor multi-TDL networks simultaneously. The CDLMS/ C2P(R) program has fielded the USQ-86 (V), consisting primarily of an UYQ-70 EPS housing four VME chassis. Three of these are populated with VME card sets for the following: C2P(R), CSDTS, and the Link Management/ Monitoring Component. This hardware configuration supports the transformation to Next Generation Command and Control Processor (NGC2P), which will introduce the Beyond Line of Sight Capabilities Joint Range Extension (JRE) and Link 22. CDLMS has successfully completed Aegis and SSDS Combat System Integration and Test (CSIT) and is currently being installed. CSDTS implementation is ongoing, enabled by, but separate from, CDLMS/C2P(R).

Status
CDLMS will be fully fielded by the end of FY 2006. NGC2P is scheduled to achieve IOC in FY 2007.

Developers
GSA/Anteon; Fairfax, Virginia
DRS Inc.; Wyndmoor, Pennsylvania

Common Link Integration Processing (CLIP)

Description
The Navy and Air Force have jointly entered into the CLIP initiative. CLIP is envisioned as an open architecture software-based common Tactical Message processing and integration capability with applications across various military platforms and installations, including air, surface, C2 shore sites, and ground-based tactical units. A chief objective is to provide greater interoperability and reduce implementation cost. CLIP will be an evolutionary spiral development process with functionality specified at each delivery point to match platform TDL requirements. It will provide the interface to all the various communication systems including current terminals and radios as well as those under development such as JTRS. It will act as a gateway providing translations and data forwarding to legacy systems and be the primary interface to any host system (i.e., combat). CLIP is envisioned to be primarily software that can reside on any operating system or hardware.

Status
A CLIP MOA between PEO-C4I & Space and Air Force Electronic Systems Center was signed in August 2003. All acquisition program documentation for Milestone B is complete and the program received Milestone B approval by ASN RD&A in May 2005. By MOA, MH-60 will be the lead USN platform, scheduled for IOC in first quarter 2009. Contract was awarded to Northrop Grumman in June 2005.

Developers
Northrop Grumman; Reston, Virginia

Combined Enterprise Regional Information Exchange System Maritime (CENTRIXS-M)

Description

The CENTRIXS-M exists as a web-centric GOTS and COTS based global network that permits multinational information sharing. CENTRIXS-M support coalition, Allied, and Joint interoperability and information exchange by providing email, web services, collaboration, and products such as Global Command and Control System Integrated Imagery and Intelligence (GCCS-I3), components for the Common Operational Picture (COP), and Common Intelligence Picture (CIP). In addition, it enables ship-to-ship and ship-to-shore Web replication, secure e-mail, chat communications over SATCOM with allied/coalition partners. CENTRIXS-M also provides a ship-to-shore SATCOM IP path to compliment existing ship-to-ship HF e-mail capabilities. The network infrastructure is implemented by using a combination of network switches, routers, crypto, servers, PCs, and commercial networks technologies. CENTRIXS supports seven different enclaves available to the warfighter: CENTRIXS Four Eyes (AUSTRALIA/CANADA/U.K./U.S.); CENTRIXS Japan (J); CENTRIXS Korea (K); NATO Initial Data Transfer System (NIDTS); Global Counter Terrorism Task Force (GCTF); Combined Naval Forces CENTCOM (CNFC); and Multi Coalition Forces Iraq (MCFI). Currently, the Pacific Region Network Operations Center (PRNOC) is the only network hub for all CENTRIXS connectivity. CENTCOM has directed that all ships deploying to NAVCENT AOR have CENTRIXS capability.

Status

CENTRIXS-M became a POR 1Q FY 2006. Milestone C Decision for Inc 1 is scheduled for second quarter FY 2007. Milestone B Decision for Inc 2 is scheduled for second quarter FY 2009. Currently, 143 out of 157 Navy ships have CENTRIXS-M connectivity. IOC for Inc 1 is fourth quarter FY 2007, Inc 2 to be determined. FOC for Inc 1 is fourth quarter FY 2018 if Inc 2 is not funded.

Developers

Hardware for procurement and development of ISNS is under the cognizance of PEO C4I/Space PMW 160 as well as OPNAV (N71). These organizations work together to identify and implement the latest technologies to ensure proper implementation into the program. Engineering, development, integration, installation, training, and life cycle support will be accomplished through Navy and Defense Department activities.

Commercial Satellite Communications: Commercial Wideband SATCOM Program (CWSP)

Description

The CWSP, formerly known as Challenge Athena, is a full-duplex, high data-rate communications link that operates in the C-band spectrum up to 2.048 Mbps. CWSP provides access to voice, video, data, and imagery circuit requirements. It supports aircraft carriers (CV/CVN), amphibious ships (LHA/LHD/LPD) and other selected ships, including hospital ships (T-AH) and submarine tenders (AS). Terminals are also installed at schoolhouse locations in San Diego, California and Norfolk, Virginia.

Examples of specific communications circuits that are provided include: Distributed Common Ground Surface System-Navy (DCGS-N), Video Tele-Conferencing (VTC), Video Information Exchange system (VIXS), Video Tele-Medicine (VTM), Video

Tele-Training (VTT), Afloat Personal Telephone Service (APTS), Integrated Digital Switching Network (IDSN) for voice/telephone, Secret/ Unclassified Internet Protocol Router Networks (SIPRNET/NIPRNET), and Joint Worldwide Intelligence Communications System (JWICS). The CWSP terminal uses commercial satellite connectivity and COTS/NDI Equipment. It has transitioned from augmentation, to surge, and in recent years has become an integral part of Navy's SATCOM architecture because of the existing and extremely overburdened military satellite communications systems.

Status

The majority of CWSP terminals procured have been installed on 35 ships. Four additional terminals are planned on new construction ships (CVN and LPD). Commercial leasing options for satellite capacity continue to be evaluated. Options to refurbish the CWSP (WSC-8) terminal are being considered.

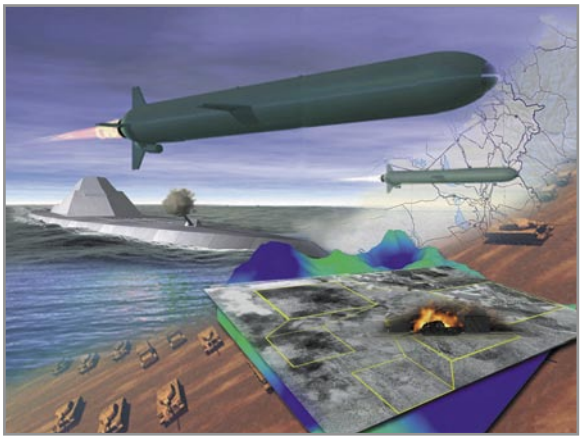
Developers

Various COTS/NDI

Distributed Common Ground System-Navy (DCGS-N)

Description

DCGS-N is the Intelligence, Surveillance, Reconnaissance, and Targeting (ISR&T) processing and exploitation component of FORCEnet that will support all levels of the command and control decision process. The Navy DCGS merges ISR&T, mission planning, and situational awareness functions into a Web-enabled, network-centric, joint-interoperable architecture. DCGS-N will support the Navy's command and control tiers of numbered fleet command ships and ashore command centers (Tier 1); Carrier Strike Group/Expeditionary Strike Group (Tier 2); and unit level strike platforms (Tier 3). Each tier will have a scalable set of DCGS-N capabilities to support its assigned roles and missions.



DCGS-N will utilize network-centric, multi-intelligence processing and exploitation to support the Task, Post, Process, Use (TPPU) process for the Commander Joint Task Force and the maritime warfighter. Leveraging existing GCCS-M, JSIPS-N, and TES-N programs, DCGS-N includes timely interfaces to national, joint, theater, and organic sensors. The aim points generated by DCGS-N will be provided to a variety of air, surface, and sub-surface launched precision guided weapons systems. DCGS-N will be interoperable with the DCGS elements of the other services through the use of the DCGS Integration Backbone (DIB) as the foundation of the DCGS-N architecture.

Status

A total of 34 systems are currently planned for installation between FY 2007 and FY 2010 on aircraft carriers, large-deck amphibious ships, fleet command ships, and designated shore-based reach-back support sites. Fleet Forces Command and OPNAV are working together to determine the appropriate afloat/shore-based architecture and fielding plan that will meet fleet ISR exploitation and targeting requirements.

Developers

Northrop Grumman; Linthicum, Maryland
Raytheon; Garland, Texas
SAIC; Columbia, Maryland
BAE Systems; Ranchero Bernardo, California

Deployable Joint Command and Control Capability (DJC2)

Description

The DJC2 is a joint DoD transformation initiative, with Navy as the lead component, to provide a standardized deployable Command and Control (C2) capability for Combatant Commanders (COCOMs) and Joint Force Commanders (JFCs). Fielding of DJC2 will greatly reduce the ad hoc nature of Joint Task Force (JTF) C2. DJC2 will provide the JFC with a level of C2 application integration that currently only exists for the Component Command (and below) headquarters. Theater level elements (e.g., Joint Communications Support Element) will provide the communications links for the fully deployed system. DJC2 will build upon the Joint Global Command and Control System (GCCS-J), the Joint Forces Command developed Collaborative Information Environment (CIE) toolkit and existing joint and service C2 programs (especially the GCCS family of systems), and lessons learned from Operation Enduring Freedom and Operation Iraqi Freedom, to equip the COCOMs and JFCs with a tested C2 system that is:

- **Horizontally and vertically integrated across all levels of command**
- **Interoperable across joint, coalition, interagency, Non-Governmental Organization/Private Volunteer Organization (NGO/PVO) realms**

> **Robust, scalable, and rapidly deployable, including an en-route capability**

Spiral development and fielding of evolving technology will help to meet COCOM and JTF requirements.

Status

The JROC validated the DJC2 Mission Need Statement (MNS) in February 2002. DJC2 received Milestone A approval in May 2002. The AoA was completed in July 2003 and the Operational Requirements Document (ORD) approved by the Joint Requirements Oversight Council (JROC) in September 2003. Milestone B approval was granted in March 2004. The Capability Production Document (CPD) was approved by the JROC in November 2004. The Navy acquired the developmental experimentation suite for Joint Forces Command in FY 2004. The initial DJC2 operational test unit (OTU) was delivered to the United States Southern Command in September 2005. Initial Operational Test and Evaluation (IOT&E) will be conducted in FY 2006. The second DJC2 OTU was used to support Hurricane Katrina disaster relief operations in New Orleans, Louisiana and will be delivered to the Pacific Command in FY 2006, followed by delivery of two systems to the European Command; delivery of an additional delivery to the Pacific command; delivery to a Joint Forces Command component; and delivery of two systems to the Joint Communications Support Element (JCSE) (supporting Central Command and other users) in FY 2007.

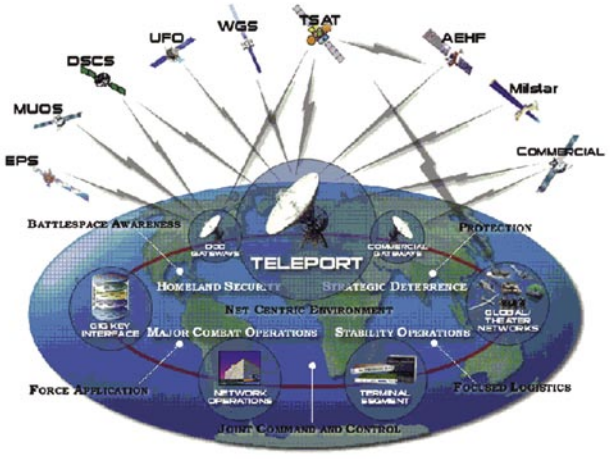
Developers

L3 Communications, Titan Group; Panama City, Florida
Lockheed Martin; Panama City, Florida
Northrop Grumman; Arlington, Virginia
Best Manufacturing Processes Center of Excellence; College Park, Virginia

DoD Teleport

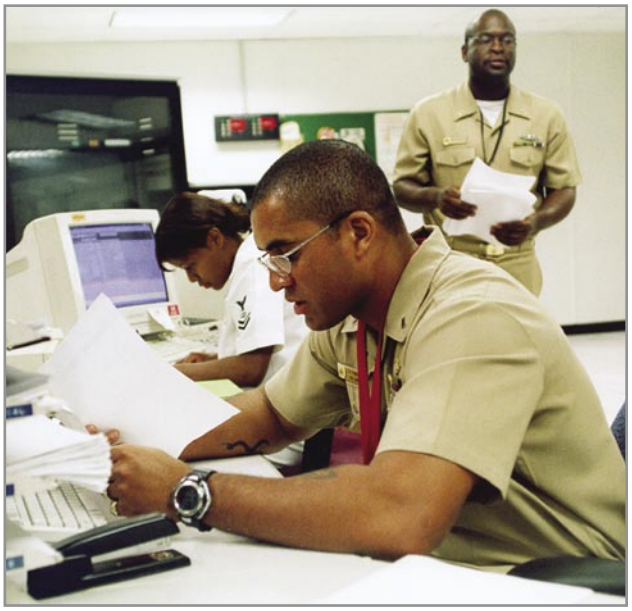
Description

The DoD Teleport links the space segment with the shore infrastructure and provides tactical users a worldwide communications interface to the Global Information Grid. Through multiple radio frequency media (military and commercial bands), Teleport provides inter-theater reach back into the Defense Information Systems Network (DISN) and service C4I systems, as well as intra-theater communications support for tactical users. Teleport consists of six primary sites and one secondary site. The Navy operates and maintains Teleports at Wahiawa, Hawaii; Northwest, Virginia; Lago Patria, Italy; and Bahrain. Non-Navy Teleports sites are located at Fort Buckner, Okinawa, Japan; Camp Roberts, California; and Landstuhl/Ramstein, Germany.



Status

DoD Teleport is an Acquisition Category (ACAT) 1AM program with OSD (NII) as the Milestone Decision Authority (MDA).



Acquisition Decision Memorandum (ADM) 5 May 2000 established DISA as the Executive Agent and Joint Requirements Oversight Council Memorandum (JROCM) 044-01 of March 2001 established Service Teleport site responsibility as well as Navy as the Teleport Requirements Sponsor. Teleport entered Milestone C for Generation One in July 2002 and reached IOC 1 with X, C, and Ku-bands in April 2004. In July 2004, the JROC approved the DoD Teleport Operational Requirements Document (ORD) Generation Two update, which will support a Milestone C decision planned in early 2006. Teleport Generation Two will provide military Ka-band and initial network-centric IP capability.

Developers
Arrowhead; Alexandria, Virginia
ViaSat; Carlsbad, California
Raytheon; St. Petersburg, Florida
ITT; Colorado Springs, Colorado

Defense Messaging System (DMS)

Description
The DMS initiative is an OSD-mandated program designed to eliminate the multitude of expensive "stovepipe" legacy record messaging systems that provide organizational and individual message traffic between operational units. The DMS architecture has been derived using the Multi-command Required Operational Capability (MROC) requirements and has been targeted to provide the armed services and agencies with a high assurance messaging capability. The DMS provides messaging, directory, and management services.

Status
Current DoD implementation of DMS closed the DMS Transitional Hubs (DTHs) for GENSER on 30 September 2003 and for Emergency Action Message (EAM) messaging on 22 February 2004. Navy is transitioning to a Web-based interface known as the DMS Expanded Boundry Solution (DEBS). This transition eliminates costly client/server architecture and consolidates the DMS service providers from 21 sites down to two. The transition to DEBS will be completed in 2008 for DMS Ashore and 2011 for DMS Afloat (Funded from the Tactical Messaging Program).

Developers
Lockheed Martin; Manassas, Virginia

Dynamic Network Management (DNM)

Description
DNM will effectively increase Link 16 Network throughput and provide the warfighter greater flexibility in the use of Link-16. DNM will facilitate automated net entry/exit of additional platforms in the future, including smart weapons with a Weapons Data Link (WDL), and will provide a real-time capability to modify Link-16 network parameters with existing messages

to meet evolving changes in the theater. DNM will also enable capabilities such as IP over Link-16, variable update and throughput rates, monitoring and analyzing of real-time network loading, and executing stacked and multi-net operations. DNM is essential to reducing Link-16 network saturation and is an enabler for the JICO Support System (JSS). It also provides essential support for time critical targeting and time critical strike. DNM includes the following capabilities: Time Slot Reallocation (TSR), Dynamic Multi-netting, Network Control Technology (NCT) used by the JICO, and a new contention access capability called SHUMA.

Status

The Air Force awarded Northrop Grumman contract for JICO Support System (JSS) Block 1, which incorporated DNM technology, in May 2005. Initial JSS Block 1 is planned for lab testing in February 2006 followed by shipboard testing in May 2006. The DNM program will enable a fully tested and interoperable version of the platform's host system, known as the Joint Host Demand Algorithm (JHDA) to support the Time Slot Reallocation (TSR) protocol, in the shipboard Command and Control Processor (C2P) in early FY 2006. TSR is also being expanded to enable further use of it on the Link 16 network (TSR RC). A random access mode that provides a nodeless, flexible, and scalable means of adapting the network to rapid changes in topology and message traffic conditions, known as SHUMA, is being lab tested. Both SHUMA and TSR RC will enable fully ad-hoc, dynamic network operations on Link 16.

Developers

SPAWARSYSCEN; San Diego, California
Northrop Grumman; San Diego, California

Global Broadcast Service (GBS)

Description

The GBS can augment and interface with other communications systems to provide a virtual two-way network to deliver a high-speed, one-way flow of high-volume information disseminated quickly by broadcast to proliferated, low-echelon, geographically dispersed users supporting situational awareness, weapons targeting, intelligence, and homeland defensive operations. GBS can support military operations with U.S. allies or coalition forces and non-DoD governmental organizations. GBS will revolutionize communications with increased capacity, faster delivery of data, near-real-time receipt of imagery and data to the warfighter, and reduced over-subscription of current MILSATCOM systems.

Status

The Navy is fielding receive-suites on carriers, larger-deck amphibious warfare ships, command ships, guided missile submarines (SSGN), and half of the nuclear-powered attack submarines (SSN). Guided missile cruisers, destroyers, and strategic missile submarines are required, but not funded. Transition

to an IP-based enhanced architecture should be completed by FY 2007. The enhanced architecture provides a nearly doubling worldwide capacity with potentially eight times more coverage. Afloat-platform capability will have up to six multiple-receive channels (each up to 24 Mbps) and support additional security enclaves (each of 70 Mbps). Compartmented enclaves such as a top secret or allied broadcast are not funded. Within bandwidth there are no constraints on the number of concurrent video stream products received for viewing on computer workstations across attached networks. The enhanced architecture permits improved sharing and reallocation of broadcast coverage and bandwidth between, users, information product, media types, and security levels. The system is more queue driven, priority based rather than scheduled based. On the larger, more capable ships or fixed shore platforms the enhanced architecture will also permit multiple satellite receive capability, including UFO and WGS or commercial satellites, concurrently.

In January 2005 the DoD approved new and maturing operational requirements defining spiral development, including automated satellite spot beam sharing (important naval requirement), two-way transmit receive suites, better management of new space segment resources, enhanced GIG integration, suit-case and rucksack portable receive suites, communications-on-the-move ground mobile receive suites, terrestrial wireless rebroadcast receive suites, global system-wide management and content sharing, flexible system restoration, and bandwidth efficiency metric reporting for better planning and system allocation planning.

Developers
U.S. Air Force, Space and Missile Systems Center/Raytheon; El Segundo, California

Global Command and Control System–Maritime (GCCS-M)

Description
As the naval implementation of the GCCS, GCCS-M is the OSD-designated Command and Control (C2) migration system for the Navy. The evolutionary integration of previous C2 and intelligence systems, GCCS-M supports multiple warfighting and intelligence missions for commanders at every echelon, in all afloat, ashore, and tactical naval environments, and for joint, coalition, and allied forces. GCCS-M meets the joint and service requirements for a single, integrated, scalable C2 system that receives, displays, correlates, fuses, and maintains geo-locational track information on friendly, hostile, and neutral land, sea, and air forces and integrates it with available intelligence and environmental information. Key capabilities include: multi-source information management, display, and dissemination through extensive communications interfaces; multi-source data fusion and analysis/decision-making tools; and force coordination. More than 56 joint and naval systems interface with GCCS-M to exchange data.

The GCCS-M program was designated an ACAT-1AC program in March 2001. GCCS-M Version 3.1.2.1 was released to the fleet in FY 2001, and included major enhancements to GCCS-M's intelligence and warfighting software applications. Version 3.1.2.1 reduces time-latency problems with Common Operational Picture (COP) track data, and enables high-data-rate communication-configured ships and shore headquarters to exchange COP track information via a faster IP transmission method. GCCS-M 4.0 completed Operational Test on USS *Nimitz* (CVN 68), COMPACFLT HQ, and COMSUBPAC HQ and was approved for full-rate production in FY 2005. GCCS-M 4.0 is a significant hardware, software and capability upgrade to the circa-1998 3.X product and is synchronized with roll-out of similar GCCS products by Joint commands and other Services. GCCS-M 4.X will deliver to all designated warships and ashore installations by the end of FY 2010. GCCS-M 4.1 software capability upgrade was approved for Milestone B in FY 2005. GCCS-M 4.1 will deliver software-only capability improvements in late 2007 in response to emerging warfighter C4I requirements and evolving security and technology standards. GCCS-M will transition to the Joint Command and Control (JC2) capability based on Net-Centric Enterprise Services (NCES) over the FYDP as these joint programs deliver capability that can be implemented to naval afloat and ashore sites.

Status

GCCS-M Afloat is installed on 260 ships and submarines throughout the Navy. GCCS-M Ashore has been installed at 36 sites including the Chief of Naval Operations Navy Command Center; five fleet commander headquarters; and various allied/NATO sites.

Developers

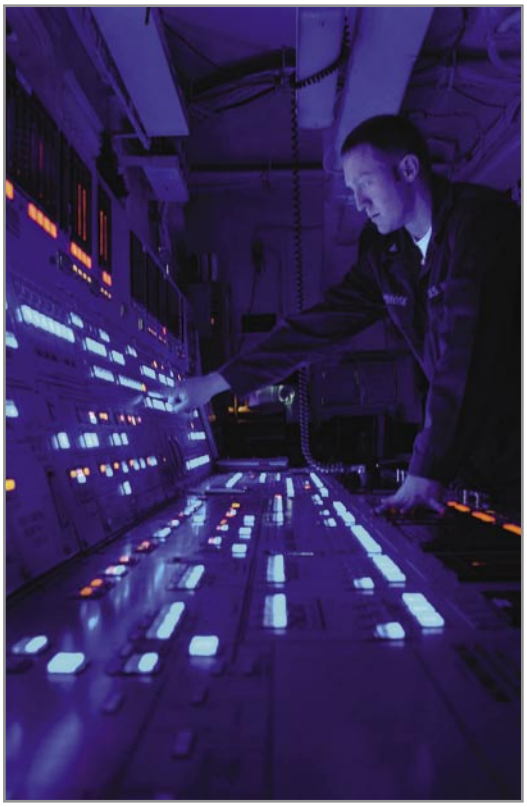
Various COTS/GOTS

Information Assurance (IA)

Description

IA is defined as information operations that protect and defend information and Information Systems (IS) by ensuring their authenticity, availability, confidentiality, data integrity, and non-repudiation. The Navy's primary IA program is Information Systems Security Program (ISSP).

FORCEnet is the Navy's component to the DoD Global Information Grid. The Navy has embraced a Defense-in-Depth strategy to protect FORCEnet by employing multiple layers of protection starting at the desktops. The IA Technical Framework (IATF) has been adopted and divides ISSP resources into three fundamental categories: technology, operations, and people. The IATF provides a documented source of technical solutions and guidance mapped to the Defense-in-Depth goals. Selection, training, and retention of network security specialists are vital elements in our ISSP arsenal.



ISSP focuses on development, acquisition, implementation, upgrade of the CND products and services such as firewalls, guards, Virtual Private Networks (VPN), intrusion detection systems, electronic key management systems, Public Key Infrastructure (PKI), and Common Access Cards (CAC). ISSP also focuses on the development of new cryptographic technology that can support a wide variety of applications and algorithms.

Status
Acquisition vehicles are in place for TYPE I Communications Security (COMSEC) and TYPE II COTS technologies to support the Navy's bandwidth requirements for secure voice and data, and PKI under the expanding umbrella of Key Management Infrastructure highlighted by the Navy's contributions to the DoD's Crypto Modernization (CM) program.

Developers
Space and Naval Warfare Systems Command (SPAWAR) provides operational support to Navy warfighter by disseminating IA information and providing technical services.

Integrated Broadcast Service/Joint Tactical Terminal (IBS/JTT)

Description
The IBS is a system-of-systems that will migrate the Tactical Receive Equipment and Related Applications Data Dissemination System (TDDS), Tactical Information Broadcast Service (TIBS), Tactical Reconnaissance Intelligence Exchange System (TRIXS), and Near Real-Time Dissemination (NRTD) system into an integrated service with a common format. The IBS will send data via communications paths, such as UHF, SHF, EHF, GBS, and via networks. This program supports Indications Warning (I&W), surveillance, and targeting data requirements of tactical and operational commanders and targeting staffs across all warfare areas. It comprises broadcast-generation and transceiver equipment that provides intelligence data to tactical users. The Joint Tactical Terminal (JTT) will receive, decrypt, process, format, distribute, and transmit tactical data according to preset user-defined criteria across open-architecture equipment. JTT will be modular and will have the capability to receive all current tactical intelligence broadcasts (TDDS, TADIXS-B, TIBS, and TRIXS). JTT will also be interoperable with the follow-on IBS UHF broadcasts. However, the current JTT form factor does not meet space and weight constraints for a majority of the Navy and Air Force airborne platforms. Therefore, to ensure joint interoperability, the Navy and Air Force will continue to support the current Multi-mission Airborne Tactical Terminal (MATT) through a low cost Pre-Planned Product Improvement (P3I) program until the transition to an IBS capable JTRS airborne variant starting in FY 2007.

Status
A receive-only JTT was delivered to the Navy for early integration efforts in the third quarter FY 2000. The Navy received the first four fully capable JTTs (with transmit capability) in third quarter

FY 2001. The Navy commenced shipboard installations in fourth Quarter FY 2001 for developmental testing. OT&E was completed in fourth quarter FY 2005. JTT fielding has occurred from 2001 to 2004. Additional installations are anticipated in 2006 and 2007. The JTTs will continue to receive the legacy broadcasts (e.g., TDDS, TIBS, TRIXS) until next-generation broadcast services are developed and fielded.

Developers
IBS: Titan/BTG; Fairfax, Virginia
JTT: Raytheon Systems; St. Petersburg, Florida

Integrated Shipboard Network System (ISNS)

Description
The ISNS program is a derivative of the common elements from various other programs of record with the purpose of providing robust LANs on all Navy ships. ISNS provides integration and support for all requisite classifications (i.e., SCI, TS, secret, non-U.S., and unclassified). It enables real-time information exchange within the ship and between afloat units, Component Commanders, and Fleet Commanders. It is also a key factor in the implementation of the Navy's portion of Joint Vision 2020. The ISNS program implements networks using a combination of network switches, hubs, routers, servers, PCs and commercial network software application technologies. It provides the capability to establish connectivity to the Defense Information Systems Network (DISN) WAN for global information distribution. In addition, it provides internal information dissemination capabilities for individual fleet units. By providing the infrastructure for shipboard C4I programs, ISNS facilitates implementation of the Navy's IT-21 strategy and is an enabler for network-centric warfare. It provides the transport medium for Web-enabling all IT-21 related programs (i.e., F, GCCS-M, Voice-Video-Data (VVD)). ISNS networks support the robust information flow requirements necessary to achieve *Sea Power 21* capabilities, as well as providing the backbone for information interoperability with coalition forces (CENTRIXS-M).

Status
ISNS installations have transitioned from ATM networks to the Gigabit Ethernet architecture. Under current procurement and installation funding, IOC for ISNS Inc 1 is fourth quarter FY 2011; Inc 2 first quarter, FY 2013; Inc 3 to be determined. ISNS was designated as an ACAT II Major Weapons Systems on 16 August 2004.

Developers
Hardware for procurement and development of ISNS is under the cognizance of PEO C4I/Space PMW 160 as well as OPNAV (N71). These organizations work together to identify and implement the latest technologies to ensure proper implementation into the program. Engineering, development, integration, installation, training, and life cycle support will be accomplished through Navy and Defense Department activities.

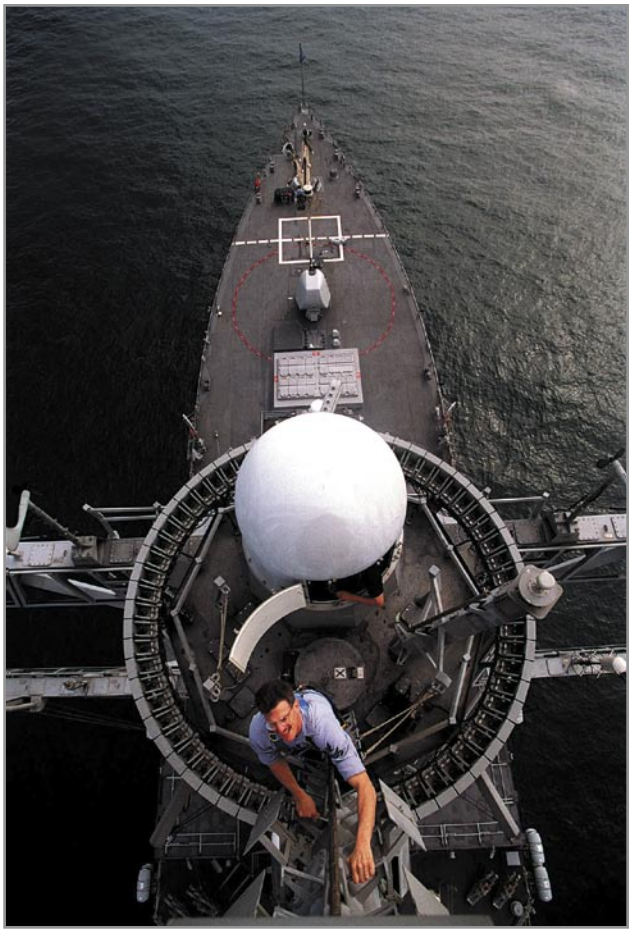
Joint Interface Control Officer (JICO) Support System (JSS)

Description
The JSS is a "tool set" enabling the JICO to plan, monitor, and manage the Multi-Tactical Data Link (TDL) network in support of the Joint Force Commander. Using the DNM tool Network Control Technology (NCT), the JICO can accommodate required changes to the operating Network including unplanned entry and egress of the Link 16 platforms. In his role as the manager of the multi-TDL network, the JICO contributes to maintaining the near real time Common Tactical Picture and responds to the requirements of the Joint Data Network (JDN) manager.

Status
Milestone C for JSS is scheduled for FY 2007 with full-rate production to follow in FY 2008.

Developers
Northrup Grumman; Reston, Virginia

Joint Tactical Information Distribution System (JTIDS)

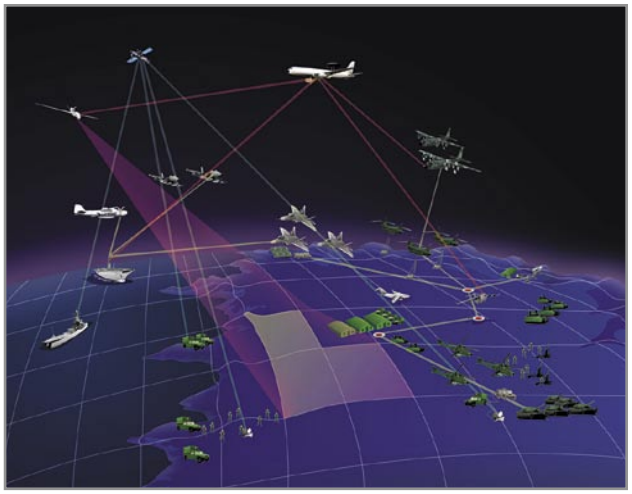


Description
The JTIDS Link 16 terminal provides rapid, secure, jam-resistant (frequency-hopping) communications, navigation, and identification capabilities appropriate for military use up to and including secret information. A joint program directed by OSD, JTIDS provides crypto-secure, jam-resistant, and low-probability-of-exploitation tactical data and voice communication at a high data rate to Navy tactical aircraft and ships and Marine Corps units. JTIDS also provides capabilities for common-grid navigation and automatic communications relay. It has been integrated into numerous platforms and systems, including Navy aircraft carriers, surface warships, amphibious assault ships, and E-2C Hawkeye aircraft; Air Force Airborne Warning and Command System (AWACS) aircraft; and Marine Corps Tactical Air Operations Centers (TAOCs) and Tactical Air Command Centers (TACCs). Other service and foreign country participants include the Army, Great Britain, and Canada. Additionally, JTIDS has been identified as the preferred communications link for Theater Ballistic Missile Defense programs. JTIDS is the first implementation of the Link-16 Joint Message Standard (J-series) and provides the single, near real-time, joint data link network for information exchange among joint and combined forces for command and control of tactical operations.

Status
The Air Force is the lead service for JTIDS. The program successfully completed OPEVAL in August 1994 and was authorized to enter full-rate production in March 1995. Production is now complete. The Multifunctional Information Distribution System (MIDS) Low Volume Terminal (LVT) is the Pre-Planned Product Improvement (P3I) to the JTIDS terminal. The MIDS Joint Tactical Radio System (JTRS) terminal is the follow-on to MIDS LVT.

Developers
GEC-Marconi Electronics Systems; Wayne, New Jersey
Rockwell-Collins Avionics; Cedar Rapids, Iowa
Northrop Grumman; Bethpage, New York

Joint Tactical Radio System (JTRS)



Description
The JTRS is a software-programmable multi-band, multi-mode family of networked radios capable of simultaneous voice, data, and video communications. The program will effect the migration of more than 25 radio families, encompassing thousands of radio systems, to the JTRS family of radio systems. All radios will be compliant with Software Communications Architecture (SCA), a single, open-system architecture. SCA, now at version 2.2, provides the standards for all JTR software in the future. In addition, JTRS will be developed with a focus toward integrated GIG transformational capabilities. At the same time the JTRS will be backwards compatible with selected legacy radio systems. At present there are five designated clusters that make up the JTRS family across DoD: handheld; man-packed; vehicular; airborne/maritime/fixed; and small form-fit. The JTRS requirements are derived from the Joint Tactical Radio System (JTRS) Operational Requirements Document (ORD) Version 3.2 dated 9 April 2003. This Joint ORD is updated annually to incorporate additional validated requirements gathered from all the DoD Services and is currently being converted to a Capabilities Development Document. JTRS will be an enabler of FORCEnet by implementing current tactical communications standards in addition to future higher data rate networking waveforms. The first iteration of JTRS for the maritime forces will satisfy narrowband waveform requirements of the JTRS ORD. This will include HF, VHF, UHF Line-of-Sight (LoS), and current and future UHF SATCOM requirements. Follow-on spiral development for maritime and aircraft platforms will provide for narrowband and wideband requirements derived from the ORD, to include the Wideband Networking Waveform.

Status
In February 2005, USD (AT&L) established a Joint Program Executive Office (JPEO) for the JTRS program. In August 2005, the JPEO determined that the JTRS program required restructuring to reduce program risk. USD (AT&L) is expected to establish the way ahead for the JTRS program in early 2006.

Developers
Manufacturers to be determined in open competition.

Lightweight Super High Frequency Satellite Communications

Description

The Super High Frequency (SHF) Satellite Communications (SATCOM) terminal AN/WSC-6(V) and parabolic antenna enables Navy ships to access the Defense Satellite Communications System (DSCS) for reliable, secure, beyond line-of-sight information exchange at medium-to-high data rates with other fleet units; fixed and mobile joint and allied forces; Navy C4I commands ashore. This capability is provided by upgraded and new WSC-6 terminal variants and enhancements to the submarine High Data Rate (HDR, see separate program summary) Antenna, which provides an SHF capability for the Navy's attack submarines. Key services available via SHF SATCOM are: Defense Information Systems Network (DISN), Global Command and Control System (GCCS and GCCS-M), broadcast record message traffic, Tomahawk Mission Planning packages and updates, imagery support, DSN telephone/ISDN access, Joint Deployable Intelligence Support Service (JDISS), Joint Worldwide Intelligence Communications System (JWICS), Unclassified-but-Sensitive Internet Protocol Router Network (NIPRNET), Secret Internet Protocol Router Network (SIPRNET), and Video Information Exchange System (VIXS)/Video Teleconferencing (VTC).

Status

SHF SATCOM capability is provided to Navy surface ships by several WSC-6 variants according to the requirements of those platforms. Surveillance Towed Array Sensor (SURTASS) platforms are configured with the WSC-6(V)1. Four aircraft carriers have the WSC-6 (V)4 variant. Numbered fleet commander flagships (AGF/LCC), the other aircraft carriers, and flag-capable amphibious ships (LHA/LHD) are configured with the WSC-6(V)5. This variant provides a dual-termination capability, enabling the ships to establish and simultaneously maintain their C4I links with Naval Computer and Telecommunications Area Master Stations (NCTAMS) and additional links with an Army, Marine Corps, or Air Force Ground Mobile Force (GMF) SHF terminal ashore in the AOR. The WSC-6(V)7 is a single-termination variant being fielded on Aegis cruisers and amphibious ship (LPD and LSD) classes. The WSC-6(V)9 is a single-termination, dual (C/X) band terminal developed to provide wideband, high data rate capability to guided missile destroyers (DDGs) and amphibious ships (LPDs and LSDs). New-construction *San Antonio* (LPD 17)-class amphibious ships are also planned for an SHF SATCOM terminal variant installation. Remaining WSC-6(V)4 terminals will be replaced with dual channel, dual antenna, WSC-6(V)7s. The WSC-6(V)9 terminal is in the process of being fielded on all DDGs (to be completed in FY 2009). Future terminal plans include the Navy Multi-Band Terminal (NMT). All WSC-6(V) variants will be equipped with the Enhanced Bandwidth Efficient Modem (EBEM) (tactical variant) in the FY 2006 to FY 2008 timeframe.

Developers
Electro-Space; Dallas, Texas
Raytheon; Marlborough, Massachusetts
Various COTS/NDI

Mark XIIA Mode 5 Identification Friend or Foe (IFF)

Description
The Mark XXIIA Mode 5 IFF is a secure, real-time, cooperative blue force combat identification system. Combat identification is a prerequisite in FORCEnet, thereby becoming a precondition for each of the other pillars as well. IFF Mode 5 uses technology advances in modulation, coding and cryptographic techniques to provide reliability, security, and performance improvements over Mode 4, which National Security Agency decertified in 2003. It is implemented through evolutionary upgrades to Mark XIIA interrogators, transponders, and processors. Mode 5 can be fielded on all DoD platforms, whether Link-capable or not. It is NATO and JROC-approved and is compatible with all U.S. and international civil IFF requirements.

Status
The Navy's ACAT II POR is based on the improved Mark XII Cooperative IFF Operational Requirements Document, dated 27 April 2001. It will be installed on over 3,000 ships and Navy and Marine Corps aircraft. The program does not include fielding of the shipboard control and display unit, F/A-18 platform integration, or Mode S shipborne interrogation capability. Milestone C is scheduled for third quarter FY 2006. IOC is first quarter FY 2009; FOC is 2015. Navy is the lead service for Mode 5 cryptographic modernization and Mode 5 synchronization across the services. Army and Air Force plans rest on Navy plans and all services' plans have IOC in 2007 and FOC in 2015.

Developers
BAE Systems; Greenlawn, New York
General Dynamics Decision Systems; Scottsdale, Arizona

Multi-functional Information Distribution System (MIDS-LVT)

Description
MIDS-LVT is a multi-national cooperative development program to design, develop, and produce a tactical information distribution system equivalent to Joint Tactical Information Distribution System (JTIDS), but in a low-volume, lightweight, compact terminal designed for fighter aircraft with applications in helicopters, ships, and ground sites. Navy procurement, limited by available resources, is targeted for F/A-18 Hornet aircraft as the lead aviation platform and surface craft. MIDS-LVT is a pre-programmed product improvement and replacement for JTIDS, providing identical capabilities at reduced size, weight, and cost. As a P3I of the JTIDS Class 2 Terminal, the MIDS-LVT will employ the Link-16 (TADIL-J) message standard of Navy/NATO publications. MIDS-LVT

is fully interoperable with JTIDS and was designed in response to current aircraft, surface ship, submarine, and ground host volume and weight constraints. The solution variants, MIDS-LVT (1), MIDS-LVT (2), and MIDS-LVT (3), support Navy, Marine Corps, and Air Force aircraft; Navy ships; Army Patriot, THAAD, MEADS and ground-based defense systems; Air Force and Marine Corps ground-based command and control platforms; and potentially other tactical aircraft and ground-based systems. MIDS-LVT is an international project partnering the U.S. with Germany, Spain, Italy, and France. The MIDS-LVT (1) variant will be used in the MIDS on ship program providing the Link 16 capability to new Construction Surface Combatants.

Status

The program entered the engineering, management and development (EMD) phase in December 1993. MIDS was approved for LRIP in FY 2000. It reached IOC on the F/A-18C/D Hornet in FY 2003. MIDS is being procured for F/A-18 C/D/E/F/G aircraft. The U.S. is the MIDS-LVT program leader with Germany, Spain, Italy, and France entering into a European partnership, called EUROMIDS. The Air Force F-15 fighter variant, MIDS-LVT (3), is currently in full-rate production and has reached IOC. The Army variant, LVT-2 entered full-rate production in September 2003. The Navy/Air Force variant, LVT-1, passed OPEVAL and was authorized to enter full-rate production on 9 September 2003. MIDS on ship is scheduled for IOC in late FY 2006.

Developers

ViaSat; Carlsbad, California
Data Link Solutions; Cedar Rapids, Iowa
Data Link Solutions; Wayne, New Jersey
An International consortium, MIDSCO, developed MIDS-LVT.
EUROMIDS will be the European producer of MIDS terminals

Mobile User Objective System (MUOS)

Description

The MUOS will provide a replacement tactical narrowband satellite communications (SATCOM) capability to the UHF Follow-On (UFO) satellite program. MUOS has been designated a DoD Space Major Defense Acquisition Program (MDAP) and will leverage commercial technology to the greatest degree possible. It will provide tactical narrowband netted, point-to-point, and broadcast services of voice, video, and data worldwide. It will consist of four geo-synchronous satellites plus a spare and provide a four-fold increase in network accesses. The target users are unified commands and joint task force components, DoD and non-DoD agencies, and allied and coalition mobile users who need to communicate while on the move.

Status

Concept exploration studies, analysis of alternatives, the Component Advanced Development (CAD) phase, and Preliminary Design Review have been completed. The Key Decision Point

(KDP) B MUOS Operational Requirements Document (ORD) was approved by the JROC on 2 August 2004. Based on technical and schedule risk, the Under Secretary of the Air Force for Space (Milestone Decision Authority) changed IOC from 2009 to 2010. The Milestone Decision Authority also approved entry into the Risk Reduction and Design Development (RR&DD) phase on 16 September 2004 (KDP B). PEO Space, PMW 146 awarded the RR&DD contract to Lockheed Martin on 24 September 2004. MUOS has now entered the Critical Design Review phase and expect to reach IOC in 2010.

Developers
Lockheed Martin; Sunnyvale, California
Boeing; El Segundo, California
General Dynamics; Scottsdale, Arizona

NATO Improved Link-11

Description
Link-22 is the next-generation NATO Tactical Data Link also referred to as the NATO Improved Link Eleven (NILE). It is a co-development program with seven NATO countries and is in the latter half of its research and development phase. As an evolutionary new Link design, Link-22 is based on modern, media-independent networking technology that will be applied in the exchange and forwarding of tactical data at extended ranges and between multiple networks over a variety of RF media. A member of the J-series family, Link-22 will complement Link-16 by providing Beyond Line of Sight (BLOS) connectivity among C2 platforms and modern, robust, relay/routing techniques. The Link-22 design includes a growth feature to accommodate the addition of SATCOM media for BLOS J-series data exchange. Link-22 will support interoperability with critical allied/coalition partners that have transitioned from Link-11 to Link-22 but do not possess a Link-16 capability. Implementation of Link-22 will ensure allied/coalition forces maintain the level of situational awareness required to plan and execute coordinated combat operations across the allied/coalition Area of Responsibility. Since Link-22 is an evolutionary Tactical Data Link (TDL), the Next Generation Command and Control Processor (NGC2P) will implement hardware and software changes that will provide a full Link-22 capability with little if any change to host combat systems.

Status
Link-22 will first be introduced in an adjunct processor to Common Data Link Monitoring System (CDLMS) in FY 2006. Full Link-22 functionality will be introduced as part of the Next Generation Command and Control Processor (NGC2P) in FY 2007.

Developers
Northrop Grumman; San Diego, California
ViaSat; San Diego, California
SPAWARSYSCEN; San Diego, California

NAVSTAR Global Positioning System (GPS)

Description

The NAVSTAR GPS is a space-based, satellite, radio navigation system that provides users with worldwide, all-weather, three-dimensional positioning, velocity, and precise time data. Navy requirements include the integration of GPS in more than 300 surface ships and submarines and 5,100 aircraft, integration of shipboard combat systems with the Navigation Sensor System Interface (NAVSSI), and anti-jam protection for high-priority combat platforms through the Navigation Warfare (NavWar) program. GPS plays an important role not only in navigation, but also in providing precise time to precision strike weapons, naval surface fire support systems and ship C4I systems.

NAVSSI is a system that collects, processes, and disseminates position, velocity, and timing data to weapons systems, and C4I and combat support systems onboard surface warships. It hosts embedded, next-generation, card-based GPS receivers. NavWar will provide anti-jam antennas for the protection of select naval platforms in order to ensure a continued high level of mission effectiveness in a GPS-jamming environment. NavWar also incorporates the capabilities of GPS modernization into Navy user equipment to receive the future military satellite signals.

Status

100 percent of the ships and submarines have completed their initial GPS installations and aircraft integrations are continuing. The FY 2006 budget supports equipping the remaining planned aircraft with initial GPS capability, providing surface combatants with modernized NAVSSIs through the FYDP, and ensuring that the GPS signal is protected on naval platforms.

Developers

Rockwell-Collins; Cedar Rapids, Iowa
Raytheon; Los Angeles, California
Trimble Navigation; Sunnyvale, California
Litton Data Systems; San Diego, California

Navy EHF/AEHF Navy Extremely High Frequency Satellite Communications

Description

The Navy Multi-band Terminal (NMT) is the future satellite communications (SATCOM) terminal that will provide protected and wideband SATCOM services for Navy ships, submarines, and shore stations. The NMT replaces the AN/USC-38 / Follow-on Terminal (FOT) series from the Navy EHF Satellite Program (NESP), a family of anti-jam, low-probability-of-intercept, and low probability of detection EHF SATCOM terminals, which provide a variety of protected command-and-control and communications applications (i.e., secure voice, imagery, data, and fleet broadcast systems). The NMT also replaces the WSC-6 terminal

series, which provides key wideband SATCOM services available via SHF, including: Defense Information Systems Network, Global Command and Control System, broadcast record message traffic, Tomahawk Mission Planning, imagery support, DSN telephone/ISDN access, Joint Deployable Intelligence Support Service, Joint Worldwide Intelligence Communications System, Unclassified-but-Sensitive Internet Protocol Router Network, Secret Internet Protocol Router Network, and Video Information Exchange System/Video Teleconferencing. The NMT will also enable the Global Broadcast Service (GBS) suite to access the GBS broadcast.

The NMT will be interoperable with Army and Air Force terminals.

The NMT will allow access to: protected EHF SATCOM services available on Milstar; EHF payloads onboard Ultra High Frequency Follow-On satellites, and three planned (one operational in 2003) Polar EHF payloads, which fly onboard classified host satellites. NMT will also allow wideband (X band) access to the Defense Satellite Communications System (DSCS) satellites and to the follow on Wideband Gapfiller Satellites (WGS). Additionally, NMT will expand protected SATCOM services to include those provided by the Advanced EHF (AEHF) satellites,

The terminal will operate in the EHF uplink and SHF downlink radio frequency spectra (X, Ka, Ku, and Q bands). The terminal will support the current EHF waveforms: EHF Low Data Rate (LDR) - 75 bps to 2400 bps, and EHF Medium Data Rate (MDR) - 4.8 Kbps to 1.544 Mbps. The NMT will also support the AEHF waveform, which will extend data-rates up to 8.129 Mbps (XDR).

Status

The NMT received Milestone B approval in October 2003. FY 2006 focuses on NMT prototype development by two competing contractors, leading to the award of an engineering development model contract in FY 2007. Initial fielding is planned for FY 2012. The FOT version of the AN/USC-38 (V), NMT predecessor continues fielding in FY2006, with a projected FOC in FY2007 for ships and 2009 for submarines.

Developers

NESP and FOT: Raytheon; Marlborough, Massachusetts
NMT developers: Raytheon; Marlborough, Massachusetts
Harris; Melborne, Florida

Navy Meteorological/Oceanographic Sensors (METOC) Sensors (Space)

Description

The Navy METOC Sensors (Space) program supports Navy interests in meteorological and oceanographic (METOC) space-based remote sensors. These interests include commitments to satellite, sensor, and operational development activities associated with the Defense Meteorology Satellite Program (DMSP) and the National Polar-orbiting Operational Environmental Satellite System (NPOESS). The sensors carried on DMSP and future NPOESS satellites provide global oceanic and atmospheric data of direct operational relevance, including sea surface temperature, wind speed and direction, sea ice conditions, precipitation rates, and storm intensity. The program provides for Navy participation in Navy/Air Force cooperative efforts leading to current and future METOC sensor development, including calibration and validation of instruments and delivery of satellite products to the Fleet.

Status

In October 1997, the program commenced development of Coriolis/Windsat, the world's first space-based sensor that passively measures ocean surface wind speed and direction, launched in December 2002. Development of the Airborne Polarmetric Microwave Imaging Radiometer (APMIR) for calibration and validation (cal/val) of the Air Force Special Sensor Microwave Imager/Sounder (SSMIS) and Coriolis/Windsat, began in early FY 1998. APMIR is in service to support the first SSMIS mission on DMSP-F16, launched in October 2003. APMIR will continue as an ongoing cal/val program for DMSP, Coriolis/Windsat, and NPOESS microwave radiometer sensors. In addition to these projects, discussions are underway with NASA, NOAA, and other agencies to fulfill the long-standing requirement for geostationary environmental imagery of the Indian Ocean.

Developers

Windsat Sensor: Naval Research Laboratory (NRL);
Washington, District of Columbia
Coriolis Spacecraft: Spectrum Astro; Gilbert, Arizona

Navy Marine Corps Intranet (NMCI)

Description

NMCI is a long-term initiative between the DoN and the private sector to deliver a single, integrated department-wide network for Navy and Marine Corps shore commands. The NMCI contract, awarded in October 2000, is a seven-year contract with a three-year option to procure service-wide IT services and provides the shore network infrastructure within the CONUS for the Navy's FORCEnet architecture. NMCI provides comprehensive end-to-end information services for data, video, and voice communications for DoN military and civilian personnel and connects to the GIG, making the DoN workforce more efficient, more productive, and better able to support the critical warfighting missions of the DoD.

Status

NMCI is operational and continues to provide commercial IT services for nearly half a million DoN employees and one Combatant Commander. To date, the DoN has ordered 335,000 of the expected 345,000 FY 2005 seats and deployed 275,000 end-state seats. Implementing NMCI has enabled the DoN to increase the security posture of its networks and has provided unprecedented visibility into IT costs. Upon completion of the Operational Evaluation (OPEVAL) in September 2003 and the delivery of the final report in April 2004, NMCI successfully completed all OSD directed milestone decision points leading to approval of full program implementation.

Developers

The NMCI contract was awarded to a team of contractors led by Electronic Data Systems (EDS). The remainder of the contractor team comprises MCI (communications circuits), Microsoft (operating systems and desktop software) Dell (desktop hardware and servers), WAMNET (network architecture), Cisco (switching and network devices), Raytheon (information assurance).

Naval Tactical Command Support System (NTCSS)

Description

The NTCSS is the Navy combat logistics support information system that enables unit commanders and their chains of command to manage and assess the readiness of unit and battle group material and personnel. NTCSS is a cornerstone of the Sea Basing aspect of the four *Sea Power 21* pillars. Sea Base includes joint command and control, fire support, and logistics. This program provides combat support systems to surface, sub-surface, and aviation operational commanders. Its support functions include organizational maintenance, supply, and personnel administration through every level of operations, in peacetime and during war. NTCSS also supports network-centric warfare by integrating logistics information for the warfighter. It replaces, merges, and optimizes legacy Shipboard Non-tactical ADP Program (SNAP),

Naval Aviation Logistics Command Manage-ment Information System (NALCOMIS), Maintenance Resource Management System (MRMS), and several smaller logistics applications into an integrated logistics system. NTCSS, through migration with the Defense Information Infrastructure Common Operating Environment (DII COE) technical architecture, will be used to complete the tactical readiness picture for operational commanders by supporting the Global Command Support System (GCSS) and the Common Operational Picture. This program employs an evolutionary strategy merging the technical and functional capabilities of the system components. The first stage of the strategy included hardware modernization and network installations using open system architectures and operating environments at all sites. This hardware environment is common with tactical programs and compliant with DII standards. The second stage involves technical optimization of the functional applications using modern software development tools, relational databases, and a common operating environment. Follow-on stages of the program involve development and implementation of Business Process Improvements (BPIs) under the sponsorship of functional and fleet managers and the movement of logistics applications into a web-based environment. BPI development, when integrated with Business Process Re-engineering and Enterprise Resource Planning efforts, will support increased efficiencies from improved operations, reduced manpower, and migration of work from afloat to ashore units. As a result, Navy will be able to reduce total ownership cost across the theater of operations.

Status

The program is currently in phase two: fielding NTCSS-Optimized on ships, submarines, and afloat and ashore aviation intermediate maintenance activities to support the modernization of the logistics operations of operating forces. Once successful Low Rate Initial Production evaluation is achieved, phase three can begin, allowing legacy SNAP III units to transform directly to the web-enabled eNTCSS environment. NTCSS-Optimized platforms will also upgrade to eNTCSS.

Developers

The COTS hardware is being procured through indefinite delivery/indefinite quantity government contracts. Engineering, development, integration, installation, training, and life cycle support will be accomplished through Navy and Defense Department activities, with additional support from industry partners.

Tactical Switching

Description

Tactical Switching and its implementation, known as the Shore Infrastructure Master Plan (SIMP), is focused on the automation and conversion of the existing circa-1970 Serial Switched point-to-

point shore infrastructure connecting three Navy Computer and Telecommunications Area Master Stations (NCTAMS), ten Navy Computer and Telecommunications Stations (NCTS), 27 NCTS Detachments, 23+ Network Operation Centers (NOC), and 5,270 personnel. The plan currently underway will invoke multiple spirals to implement the technology and automation and infrastructure necessary to evolve the shore infrastructure to two Regional Network Operations and Security Centers (Atlantic/Pacific) and one Global Network Operations and Security Center providing interoperable joint global network-centric services and connectivity to tactical and strategic naval assets. This architecture will be managed, monitored, operated, maintained and defended with fewer than 50 percent of today's manpower resources and eliminate more than 70 percent of today's fixed sites further reducing infrastructure costs.

Status

During FY 2005, the Tactical Switching program provided High Speed Global Ring (HSGR) connectivity between the five critical regions, which enabled accelerated consolidation of services into the Atlantic and Pacific regions. Significant progress has been made to convert the existing Tactical Video Teleconferencing (VTC) to IP reducing reliance on the serial infrastructure and installation of Element Management Systems that will enable remote management and operations of existing equipments. Enterprise Management and Monitoring systems are currently being evaluated to further consolidate services and personnel as well as provide tactical and strategic visualization of the Navy enterprise to service and Combatant Command/Commander (COCOM) agencies NetOps in support of GIG operations.

Developers

PEO C41 and Space; San Diego, California

Trusted Information Systems (TIS)

Description

TIS provides a complete cross-domain capability for the automatic exchange of critical intelligence and operational information between U.S., Allied, and Coalition forces. TIS includes both the Radiant Mercury (RM) and Joint Cross Domain Exchange (JCDX) systems. Both systems are Director of Intelligence Directive 6/3 Protection Level 4 (PL-4), Multi-level Secure (MLS) certified providing unique cross-domain information sharing capabilities from top secret SCI to GENSER and GENSER to unclassified.

RM is certified and accredited by both the SCI (top secret and below interoperability) and GENSER (secret and below interoperability) communities. RM provides a fully-automated, bi-directional, multiple input/output channel capability, that can be serial or network connected, to sanitize, transliterate, downgrade, and guard classified, formatted information to users at

lower classification levels. RM also processes unformatted message types and imagery utilizing reliable human review (semi-automated). RM is deployed to more than 160 sites worldwide including all Combatant Commands, Navy large-deck aircraft carrier and amphibious warships, Shared Early Warning, Blue Force Tracking and numerous Air Force and Army sites as well as national agencies.

JCDX is DoD's only comprehensive multi-level C4I system certified to connect to multiple networks at multiple security levels. JCDX serves as the backbone automated information system providing accredited manual and automatic exchange of multilevel Common Operational Picture (COP), e-mail, imagery, and event-by-event data dissemination. The system provides MLS C4I and cross-domain services to U.S. Joint Intelligence Centers and is the national level defense intelligence system for the United Kingdom and Australia, and is the service-level operational intelligence system for the Japanese Maritime Defense Forces as well as the Republic of Korea.

Status

Current developments are focused on migrating TIS certified MLS capabilities into a Services Oriented Architecture and integrating with additional afloat, joint, and coalition-network architectures. As the Executive Agent of the multi-service RM program, the Navy will continue to oversee RM and RMIG support to more than 160 locations worldwide. JCDX/OED installations are planned at Maritime Surveillance System (MSS) sites in FY 2006 to support U.S. Secret/Allied/Special Category (SPECAT) interoperability.

Developers

Maxim Systems; San Diego, California
Northrop Grumman Mission Systems; Arlington, Virginia
Lockheed Martin; Denver, Colorado
Booz Allen Hamilton; Chantilly, Virginia

UFO UHF Satellite Communications Follow-On

Description

The Ultra High Frequency (UHF) Follow-On (UFO) satellite program comprises eight satellites and one on-orbit spare, and it replaced the Fleet Satellite (FLTSAT), Gapfiller, and Leased Satellite (LEASAT) UHF constellations. UHF SATCOM services, provided by UFO, include worldwide, narrowband, unprotected netted, point-to-point, and broadcast service of voice, video, and data using 5 and 25 Khz UHF channels. UFO also provides a protected Fleet Broadcast using an Extremely High Frequency (EHF) uplink and UHF downlink to provide an anti-jam capability on the uplink. UFOs 4-11 carry an EHF payload that provides anti-jam capability on the uplink and downlink. Protected services include netted, point-to-point, and broadcast service of voice and data. The EHF payload also provides an anti-jam telemetry tracking and control uplink capability. UFOs 8-10 also include a

Global Broadcast Service (GBS) payload. GBS uses direct broadcast technology at an extremely high data rate to many users via very small terminals.

Status

Eleven satellites have been launched and nine are operational. The launch of UFO 1 was a failure, and UFO 10 was launched in November 1999 as a replacement. A Gapfiller (UFO-11) was launched in December 2003 to maintain constellation availability at minimum acceptable 70 percent through 2010 to coincide with the launch of MUOS. UFO 3 failed in orbit in June 2005. This moved the UFO 70 percent availability from 2010 to 2009. Mobile User Objective System (MUOS) is still on track to begin replacing UFO in 2010 leaving a potential 12 month gap.

Developers

Boeing Satellite Systems; Los Angeles, California
SPAWAR Systems Command; San Diego, California

Undersea Warfare-Decision Support System (USW-DSS)

Description

The USW-DSS program provides an integrated, near-real time, network-centric Undersea Warfare (USW) Command and Control (C2) capability across multiple platforms, even with low bandwidth or intermittent inter-platform communications. USW-DSS leverages existing communication links, networks, contact pictures, and sensor data from air, surface, submarine, theater, and surveillance platforms and integrates them to produce a common USW near-real time decision support tool. It provides a critical capability, not only for the Sea Combat Commander (SCC), but also for the Theater USW Commander (TUSWC), Antisubmarine Warfare Commander (ASWC), and Mine Warfare Commander (MIWC), for an integrated capability to plan, conduct, and coordinate USW operations with multiple ASW and MIW platforms. USW-DSS will provide common and improved visualization, integrated USW platform sensor data sharing, reduced data entry, improved performance prediction, reduced redundancy across USW Tactical Decision Aids (TDAs), and data fusion, which is currently not available to the SCC. USW-DSS will provide greater understanding of the undersea battle space by allowing the entire force (CSG/ ESG, theater, or other) to have a common, thorough understanding of the battle space with characterized uncertainties. USW-DSS will also serve as the single consolidated repository for all USW TDAs across all USW platforms, thus saving the cost of maintaining numerous individual applications, TDAs, and stove-piped systems.

USW-DSS uses the spiral development process. A peer review group will select current and developmental technologies to be incorporated into a build-test-build process to develop a network-centric USW capability. USW-DSS Builds 1-4 (FY 2006-FY 2011) will align with Common Operating Environment (COE)/Global

Command and Control System-Maritime Applications (GCCS-M)/Net-Centric Enterprise Services (NCES), FORCEnet, Joint Command and Control (JC2), as a maritime application, and Program Executive Office for Integrated Warfare Systems (PEO IWS) open architecture. Current plans are for USW-DSS to transition into a GCCS-M application with a subsequent migration as a maritime application, in JC2.

Status
USW-DSS currently uses a Top Level Requirements (TLR) document signed by the Warfare Sponsor, Task Force ASW (formerly N74) on 2 October 2003, and was documented based on high-level guidance from a Net-Centric USW (NCUSW) Mission Needs Statement (MNS). The TLR is being updated to incorporate new requirements resulting from the C2 in ASW Study. In FY 2006, USW-DSS will be installed on two carrier strike groups as well as theater USW assets. Candidate platforms include CVNs, DDGs, CGs, MCM vessels, submarines, P-3s, SURTASS vessels, and supporting shore nodes (CTF, TSC, Training, and NOPF).

Developers
Multiple Navy and university labs and industry participants will perform the various developer and manufacturer roles. The software integration role for each Build (1-4) will be competed amongst industry and labs.

Web Enabling (WEN)

Description
WEN efforts were started by the CNO in April 2001 as a transition effort. One of the key requirements in any network-centric warfare architecture is the ability to exchange data transparently. Throughout recent years there have been many DoD and DoN attempts to meet this requirement, some more successful than others. WEN will help to make the warfighter more productive with inclusion of tools such as sharing of disparate data base information between systems and the ability to rapidly manipulate and customize the presentation of such data to the needs at hand.

Implementation of the WEN is part of the transformation process that will rationalize many of the inconsistencies in the way Navy information systems currently work together. To achieve this transformation, WEN will leverage and influence the planned capabilities and resources of IT programs within both the shipboard (ISNS), Base Level Information Infrastructure (BLII) and Navy and Marine Corps Intranet (NMCI) shore environments. At the enterprise level, the NMCI ashore WEN portal and the ISNS afloat WEN portal will interface to share user information, data, services, and content. The BLII overseas and the Marine Corps Enterprise Network (MCEN) will also leverage these capabilities as they are implemented. Enabling technologies and processes to be employed include PKI enabled Single Sign-On, a Naval Global Directory Service providing a single flat name-space for users;

synchronization of user directories, a synchronized relationship between portal instances; and establishment of a common data replication process between NMCI, BLII, MCEN, and ISNS.

Status
IOC was provided in FY 2004. Classified and unclassified portal pilots have been implemented ashore and afloat. These pilots are consistent with the guidance specified for the enterprise Web architecture, and will be rolled into the NMCP infrastructure concurrent with the IOC of the NMCP. The afloat and ashore portals will be fully connected for redundancy, replication, and ease of access. Further implementation is subject to funding. Incorporation to the architectures is planned for FY 2006.

Developers
SPAWAR has the lead in architecting, implementing, and testing the infrastructure and services that comprise the Navy Enterprise Portal-Afloat. General Dynamics has the contract for upgrade of Baseline II that will include Web Enabling capabilities. ISF/EDS is the contract company for NMCI.

AIRBORNE SYSTEMS

Aerial Common Sensor (ACS)

Description
The transformation of Naval Airborne Information Warfare is driven by the need for a capability supporting a variety of ISR, target acquisition and Information Warfare/Operations (IW/IO) missions during peacetime and through all levels of war. ACS will replace the Information Warfare capability of aging EP-3E aircraft. ACS will align with all *Sea Power 21* pillars, but will primarily support FORCEnet by providing fused Multi-INT derived time critical, actionable information to the warfighter. Accomplishing this requires a combination of sensors, including Signals Intelligence (Communication Intelligence/Electronic Intelligence), Imagery Intelligence (IMINT (Electro-Optical (EO)/Infrared (IR)), Synthetic Aperture Radar (SAR), Multi-Spectral and Hyper-Spectral Imaging (MS/HSI)), Ground/Maritime Moving Target Indicator (G/M MTI), and Measurement and Signatures Intelligence (MASINT) systems. ACS will be capable of multiple operational configurations, using a combination of onboard and off-board collection, processing and reporting operations. ACS will be a primary ISR node within FORCEnet and will use joint standards and architectures to achieve interoperability across the Global Information Grid. This transformational process will allow ACS to make optimum use of external processing while maintaining exploitation, fusion, and dissemination capabilities within the Battlespace. The aforementioned capabilities will allow for better use of Low density/High demand (LD/HD) personnel assets, deploy with a smaller footprint, and garner a significant manpower reduction. Supporting the Navy objective to provide im-

mediately employable forward-deployed naval forces, ACS will deploy anywhere in the world within 72 hours. Operating initially without support and with a minimum footprint, ACS will be capable of conducting operations en route and immediately upon arrival in theater.

Status
Initial Army ACS contract (addressing JROC approved Army and Navy ISR requirements) was awarded to Lockheed Martin in July 2004 and terminated in January 2006. ACS program development will proceed following 2006 Joint service study of ISR requirements. The EP-3E (see separate program summary) will be modernized to a common configuration and sustained until Navy ACS reaches IOC.

Developers
To be determined.

E-2 Hawkeye Airborne Early Warning Aircraft Upgrade

Description
The E-2 Hawkeye is the Navy's airborne surveillance and command-and-control platform, providing battle management and support of decisive power projection at sea and over land in a joint operational architecture. In addition to current capabilities, the E-2 has an extensive upgrade and development program to prepare it as a critical element in an overall joint theater air and missile defense program.

Two upgrades will ensure that Hawkeyes keep pace with changing tactical environments: the E-2C Hawkeye 2000 and the E-2D Advanced Hawkeye (AHE), including the Radar Modernization Program. The E-2C Hawkeye 2000, the most advanced Hawkeye variant in production, features Mission Computer Upgrade (MCU), Cooperative Engagement Capability (CEC), Improved Electronic Support Measures (ESM), Joint Tactical Information Distribution System (JTIDS), Global Positioning System (GPS), and data and voice satellite communications. The MCU greatly improves weapons systems processing power enabling the incorporation of CEC. In turn, CEC-equipped Hawkeyes will significantly extend the engagement capability of surface forces. It is the key to early cueing of the Aegis Weapon System, dramatically extending the lethal range of the Standard Missile (SM-2). The Advanced Hawkeye's Radar Modernization Program is developing a radar that will bring over-the-horizon, overland detection, and tracking to the strike group. This, coupled with CEC, will fully integrate Advanced Hawkeye into the Joint Integrated Air and Missile Defense (JIAMD) role. This advanced detection and tracking capability, in conjunction with Aegis and the upgraded Standard Missiles, will allow strike groups to deploy an organic, theater-wide air and cruise missile Sea Shield umbrella to protect high-priority areas and U.S. and coalition forces. The E-2's systems are fully interoperable with the Airborne Warning and Control System (AWACS) and ground-

based systems for a seamless joint architecture. The Hawkeye will continue as the airborne "eyes and ears" of the fleet as it applies its capabilities in the integrated joint, overland, theater-wide air and cruise missile-defense environment. Many of the technological improvements being incorporated in the Hawkeye represent leading-edge improvements in U.S. forces, not just in the Navy's theater air and missile defense programs.

Status
The Navy intends to procure 26 Hawkeye 2000s through 2009. CEC passed Technical and Operational Evaluations and is now in the Fleet. Two E-2D Advanced Hawkeye System Development and Demonstration aircraft had their keels laid in April and July 2005 respectively. First flight is scheduled for fourth quarter FY 2007, with IOC in FY 2011.

Developers
Northrop Grumman; Bethpage, New York
Northrop Grumman; St. Augustine, Florida

EP-3E Modification and Sustainment

Description
The EP-3E is the Navy's only airborne Information Warfare (IW) and tactical Signals Intelligence (SIGINT) platform supporting naval and joint commanders. EP-3Es provide long-range, high-endurance support to aircraft carrier strike groups and expeditionary strike groups in addition to performing independent maritime operations. The current force consists of two active squadrons. The original EP-3E Joint Airborne SIGINT Architecture Modification (JMOD) program has been restructured to bring all EP-3E platforms into a common configuration and will be sustained until Aerial Common Sensor (ACS), a joint development program with the Army, can be fielded with an FOC of approximately 2017. EP-3E modernization/sustainment strategy includes three elements: P-3 to EP-3E conversions; EP-3E JMOD common configuration; and airframe inspections/repairs.

P-3 to EP-3E conversions: The P-3 to EP-3 conversion program converts five P-3C Orion aircraft to EP-3E platforms. Four will be completed in FY 2005 and one in FY 2006.

EP-3E JMOD common configuration: The EP-3E JMOD Program has been restructured to align all EP-3E mission systems to a common baseline that meets the challenge of rapidly emerging threat technology, identified as the JMOD Common Configuration (JCC). JCC will address mission system obsolescence and incorporate "quick reaction" capabilities specifically developed for OEF/OIF. JCC will also accelerate capabilities, developed under the JMOD program, to the fleet five years ahead of schedule. The JCC includes expanded ELINT exploitation capability and COMINT signals coverage, new multi-platform COMINT Direction-Finding Capability, and advanced Special Signals-Collection capability.

Inspections/repairs: EP-3Es will be sustained through a series of Special Structural Inspections (SSIs) and Special Structural Inspection-Kits (SSI-Ks). SSIs will be completed on all aircraft. SSI-Ks will be completed on select aircraft meeting criteria as required and will include preemptive replacement of fatigue critical structures.

Status

The EP-3E JCC ORD was approved on 10 June 2005. The JCC Development/Production Contract was awarded on 29 June 2005. The EP-3E will be modernized to a common configuration and sustained until Navy ACS (see separate program summary) reaches IOC.

Developers

L3 Communications;Waco, Texas
Northrop Grumman; Baltimore, Maryland
Titan;Vienna, Virginia
Aeronixs; Melbourne, Florida
General Dynamics; San Jose, California
Allied Signal; Sunnyvale, California
TRW; Sunnyvale, California
EDO Corporation; San Jose, California
Lockheed Martin; Fort Worth, Texas and Denver, Colorado
Naval Surface Warfare Center (NSWC); Crane, Indiana
NSWC; Dahlgren, Virginia
Naval Aviation Depot; Jacksonville, Florida

Naval Mission Planning Systems (NAVMPS)

Description

NavMPS is a suite of applications that allow aircrew to perform tactical mission planning at the secret level for a wide variety of aviation platforms and air launched weapons. NavMPS consists of the Joint Mission Planning System (JMPS), Tactical Automated Mission Planning System (TAMPS), and the Navy Portable Flight Planning Software (N-PFPS). The Joint Mission Planning System (JMPS) is the next generation mission planning system. JMPS is a collaborative development effort by the Navy, Air Force, Army, and SOCOM that will bring all "stovepipe" legacy DOD mission-planning systems under one program with a common framework. JMPS is a single source for preflight planning including aircraft performance data, fuel planning, route planning, threat assessment, precision and conventional weapons planning, and provides the interface to load mission data onto the aircraft. TAMPS is the legacy Navy/Marine Corps standard unit-level aircraft mission planning system for tactical aircraft. N-PFPS is the Navy/Marine Corps standard flight-planning system that covers non-TAMPS aircraft, primarily the helicopter community.

Status
JMPS began replacing TAMPS in FY 2005. The final version of TAMPS will be removed from the fleet in FY 2006. JMPS will replace PFPS in FY 2008. JMPS Core Architecture commenced development in 1998 and reached IOC in FY 2004. Expeditionary warfare planning-capability is scheduled for incorporation into the JMPS architecture during FY 2006.

Developers
BAE Systems; Camarillo, California
USAF 46TS/TYBRIN; Fort Walton, Florida
Northrop Grumman; San Pedro, California

SUBMARINE SYSTEM

Common Submarine Radio Room (CSRR)

Description
The CSRR modernizes the radio rooms on *Seawolf* (SSN 21), *Ohio* (SSBN 726, SSGN 726), and *Los Angeles* (SSN 688)-class submarines based on the Exterior Communications System (ECS) architecture in development for *Virginia* (SSN 774)-class submarines. The system includes up to two High Data Rate (HDR) and/or up to two OE-538 Multi-function Masts (total of two masts per ship) for enhanced wideband connectivity. A common approach to submarine radio room modernization provides the submarine force with the added benefit of common training, common logistics, and common technical insertion.

Status
There are currently seven submarines, spanning three classes, installed with the CSRR design. All class submarines are to be back-fitted by FY 2014.

Developers
Lockheed Martin; Eagan, Minnesota
Naval Underwater Warfare Center; Newport Rhode, Island
Space and Naval Warfare Systems Center; San Diego, California

Submarine High Data-Rate Antenna (HDR)

Description

The submarine HDR antenna program is a top-priority submarine C4I initiative and is the Navy's first multi-band dish antenna. The HDR antenna provides the submarine force with worldwide high data-rate satellite communications capability. It enables the submarine to access the secure, survivable Joint MILSTAR Satellite Program in the Extremely High Frequency (EHF) band. It also provides the capability to receive time critical tactical information from the Global Broadcast Service (GBS). Additionally, the HDR antenna will provide access to the Defense Satellite Communications System (DSCS) in the Super High Frequency (SHF) frequency band.

Status

The HDR Antenna is currently installed on fast attack submarines, with all submarines being outfitted by FY 2009. SHF FOT&E is scheduled for FY 2007 with the implementation of SHF FOT.

Developers

Raytheon; Marlboro, Massachusetts

Submarine Local Area Network (SubLAN)

Description

SubLAN provides separate secret, top secret, SCI, and unclassified LANs with full network services and connectivity. It integrates non-tactical subsystems and applications, including Task Force Web's Navy Enterprise Portal and back-fit versions of *Virginia* (SSN 774)-class Web-enabled "paperless ship" applications. It accommodates hardware/software upgrade and technology insertion for the life of the ship.

SubLAN provides end-to-end connectivity for all tactical and non-tactical subsystems, enabling battle force/JTF interoperability and enables ship-wide access to the common operating picture, JWICS/SIPRNET/NIPRNET e-mail and Web browsing, battle force chat, and other collaborative tools.

Status

SubLAN 1 installations commenced in FY 2004 and will complete in FY 2011. SubLAN 2 installations will commence in FY 2009 and are planned to complete in FY 2014.

Developers

Naval Underwater Warfare Center; Newport, Rhode Island
Space and Naval Warfare Systems Center; San Diego, California
SAIC; Sterling, Virginia

SURFACE AND EXPEDITIONARY SYSTEMS

Advanced Combat Direction System (ACDS)

Description

The ACDS is a centralized, automated command-and-control system. An upgrade from the Naval Tactical Data System (NTDS) for aircraft carriers and large-deck amphibious ships, it provides the capability to identify and classify targets, prioritize and conduct engagements, and exchange targeting information and engagement orders within the battle group and among different service components in the joint theater of operations. ACDS is a core Sea Shield component of non-Aegis/non-SSDS combat systems.

Status

ACDS Block 0 is deployed on six aircraft carriers, five *Wasp* (LHD 1)-class amphibious assault ships, and five *Tarawa* (LHA-1)-class amphibious assault ships. ACDS Block 1 is installed in USS *John F. Kennedy* (CV 67), USS *Nimitz* (CVN 68), USS *Wasp*, and USS *Iwo Jima* (LHD 7). ACDS Block 1 failed OPEVAL and is slated for replacement on *Eisenhower*, *Nimitz*, and *Iwo Jima* by 2007 with the Ship Self-Defense System (SSDS, see separate program summary).

Developers

Raytheon; San Diego, California
Raytheon Space and Naval Warfare Systems Center;
San Diego, California
Integrated Combat Systems Test Facility (ICSTF) and Naval Surface Warfare Center Port Hueneme Division (NSWC/PHD);
Dam Neck, Virginia

Communications Data Link System (CDLS)

Description

The USQ-167 CDLS is a shipboard system that supports Navy and joint airborne sensor programs that require data communications with shipboard processors. Part the Common Data Link (CDL) family of communication systems. CDLS receives data from remote sensors and transmits data to airborne platforms via the CDL waveform at high data rate.

Status

Communications Data Link System (CDLS) is in production and is installing on CVNs, LHDs, and LHAs.

Developers

CUBIC Corporation; San Diego, California

Cooperative Engagement Capability (CEC)

Description

The Navy's CEC has demonstrated significantly improved battle force air defense capabilities by integrating the sensor data of each cooperating ship and aircraft into a single, real-time, fire-control-quality, composite track picture. CEC also interfaces the weapons capabilities of each CEC-equipped ship in the battle group to support an integrated engagement capability. By simultaneously distributing sensor data on airborne threats to each ship within a battle group, CEC extends the range at which a ship can engage hostile missiles to well beyond the radar horizon, significantly improving area, local, and self-defense capabilities. Operating under the direction of a designated commander, CEC will enable a battle group or joint task force to act as a single, geographically dispersed combat system. CEC provides the fleet with greater defense-in-depth and the mutual support required to confront the evolving threat of anti-ship cruise missiles and theater ballistic missiles.

Status

IOC for the shipboard CEC system, USG-2, was declared in FY 1996. TECHEVAL and OPEVAL were successfully completed in 1998-2001 following extensive development and testing of shipboard combat systems with which CEC interfaces. The report of the Commander, Operational Test and Evaluation Force is complete and shipboard CEC was determined to be ready for fleet use. In April 2002, the Defense Acquisition Board (DAB) approved full-rate production for the USG-2 shipboard equipment sets and LRIP for the USG-3 airborne equipment sets. In September 2003, USD (AT&L) approved FY 2004/FY 2005 follow on LRIP for the USG-3.

By the end of 2005, CEC systems will have been delivered for installation or installed on 34 ships (Aegis CGs and DDGs, carriers, and amphibs) and five E-2C Hawkeye 2000 air squadrons. The USG-3 E-2C Hawkeye 2000 FOT&E-1 was completed in November 2002 and was evaluated as potentially ready for fleet use. FOT&E-2 was conducted in FY 2004 and the USG-3 airborne CEC system was declared "operationally effective," but required further evaluation. IOC for the airborne system was declared in May 2005. Full Operational Capability for the shipboard and airborne systems was declared in May 2005. Interim suitability deficiency resolutions will be in place mid-2005, final resolutions by the end of 2005. FOT&E-3 and FOT&E-4, CEC Software Baseline 2.1 for CVN 69 and LPD 17, are scheduled for FY 2006. CEC is a spiral development program. The revised CEC acquisition strategy was approved in August 2004. This will help achieve DoD system improvements including overall reduced system cost, size, and weight, less power and cooling, and open network architecture initiatives including SIAP common track management capability and GIG sensor fusion initiatives. The Navy is also coordinating with Joint Staff and OSD to explore potential multi-service avenues for CEC capability implementation that will expand sensor netting track

data availability to meet a variety of warfighter needs across various platforms including ground mobile systems.

Developers
Johns Hopkins University, Applied Physics Laboratory; Laurel, Maryland
Raytheon; St. Petersburg, Florida

SCI Networks

Description
SCI Networks (previously known as TACINTEL II/SCI ADNS) is an IP-capable, network-centric, automated, communication system for real-time receipt and transmission of Special Intelligence (SI) and Sensitive Compartmented Information (SCI) data while satisfying established Information Assurance (IA) Computer Security criteria. SCI Networks provides secure and reliable IP communications for Cryptologic, Intelligence, and Information Operations (IO) systems supporting strike group commanders; including Direction Finding (DF) Data Transfer, Record Messaging, E-Mail, Chat, File Transfer and Web Browsing. SCI Networks uses open-architecture standards, and is thus a critical element in the Navy's evolving concept of network-centric warfare. The full capability will include voice, video and data transfer among SCI-capable ships and submarines, with gateways to shore nodes. Under the submarine phase of the program, SCI Networks brings the top secret enclave to submarines in addition to the SCI enclave. SCI Networks is the lead program for implementing the SI/SCI portion of the Joint Maritime Communications Strategy (JMCOMS) under the C4I Networks initiative.

Status
Installation of the Shore Network Operations Center Facilities is complete and the Defense in Depth DCID 3/6 security upgrades was completed in FY 2005. Installation of Build 2 ship hardware began in FY 1999 and was completed early in FY 2003. Software Release 2.2 began fielding in second quarter of FY 2003 and reached FOC in FY 2005. A Milestone III full-rate production decision was approved on 4 October 2001. Incremental hardware and software upgrades scheduled through FY 2005 and beyond will provide the following capabilities: Defense in Depth security, Submarine Version (includes the TS Enclave), Packet Prioritization, Direct Ship-to-Ship Network Services, Quality of Service, Interface to Defense Messaging System (DMS), an Interface Afloat to DMS, VoIP and an Airborne EDM version. A Maintenance Modification to address the WINDOWS NT End of Life security issue will be executed between FY 2006 and FY 2009. SCI Networks has been designated as an evolutionary program allowing for continued growth and expansion through future technology insertion. It provides the mechanism for phased implementation of both planned improvements and those that surface through advancing technology. The premise of using COTS, GOTS, NDI and existing systems to meet the requirements for SI communications

will continue to be followed. To realize the FORCEnet architecture, FY 2008 through FY 2012 program funds will procure and incorporate Increment 1 capabilities necessary to implement the emerging DoD/Joint architecture enabling SCI Networks to continue providing rapid, reliable, and secure SI communications to the Fleet well into the future.

Developers
SAIC; Arlington, Virginia

Ship Signal Exploitation Equipment (SSEE) Increment E

Description
The SSQ-137 SSEE Increment E is a Shipboard Information Warfare Tactical Cryptologic Systems program that provides commanders with threat search and identification information and electronic attack options. SSEE provides deployed forces with an afloat IW sensor. SSEE is a COTS/NDI program that is easily reconfigured and therefore able to respond rapidly to tasking. The system design permits the rapid insertion of new and emerging technologies that will integrate capabilities from existing systems and advanced technologies into a single, scalable, spirally developed, interoperable system.

Status
SSEE Increment E is in full-rate production.

Developers
Argon ST; Fairfax, Virginia



Sea Warrior

Sea Warrior is the Navy's commitment to the professional growth and development of our Sailors for the 21st Century. Sea Warrior is a single integrated system, the lynch pin in concept and in execution, providing the description of a job, an individual, and bridging the difference between the two. Integral to the Navy's Strategy for our People, Sea Warrior will enhance warfighting performance by ensuring that we identify the right person, at the right place, with the right skill, at the right time, attaining the best value. Building on the Human Systems Integration principles (human factors engineering, personnel, habitability, manpower, training, environment, safety and occupational health, and survivability), the Human Systems Integration Functional Group of the Virtual Systems Command teamed with the Sea Warrior Enterprise Task Force to successfully integrate the Sea Warrior and SEAPRINT (Systems Engineering, Acquisition and Personnel Integration), concepts within the systems engineering process. Sea Warrior combines a continuous career management, growth and development centered perspective on the Sailor (active and reserve) and civilian workforce that is critical and relevant to the Navy's overall mission. Mission accomplishment through active participation by the Navy's force of professionals is the key concept of Sea Warrior.

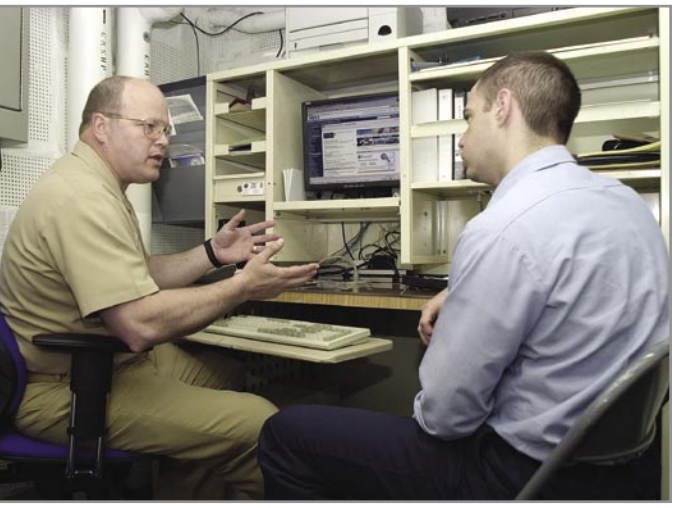
TOTAL FORCE MANAGEMENT

As the Navy becomes more technology-intensive vice manpower-intensive, we have been able to leverage new advances in platform (e.g., ships) and system design to shed non-essential functions and improve productivity and warfighting readiness.

Navy is refining the shape of the force and skill mix to provide the high-tech specialized skills needed to respond to new technology and new missions.

The Revolution in Training shifted training priorities from system-centric training solutions to a Sailor-centric human performance approach. Solutions now focus on precise skills and competencies (skill objects) required of a Sailor to perform in complex operational environments on optimally manned platforms and systems. Successful integration of Human Systems Integration in acquisition demands top down, total systems, functional analysis process that determines specific functions and tasks (attributable to hardware, software, and humans) and defines the skills required to perform the human tasks. This enables the Navy to improve

human performance, develop measurable human performance metrics and tailor human performance solutions to meet new and emerging mission requirements. The Integrated Learning Environment enables Sea Warrior and Human Systems Integration (SEAPRINT) to deliver knowledge to Sailors when and where it is needed, improving individual, team performance and mission readiness.



INTEGRATED LEARNING ENVIRONMENT

The Integrated Learning Environment provides four primary services:

- **Individual learning plans derived from validated training requirements**
- **Delivery of essential learning and performance support content**
- **Sailors accessing learning content, ashore and afloat**
- **Performance assessments**

The Navy Enterprise, including Acquisition Program Executive Officers and Program Managers, can leverage Sea Warrior and Integrated Learning Environment capabilities to produce financial and performance benefits, reduce development/life cycle costs (e.g., manpower, training content, learning management system, delivery environment redundancies) while providing increased operational readiness and enhanced warfighter performance. Most ship acquisition programs include a requirement for an onboard training delivery system and often build redundant learning management and content delivery system capabilities that already exist. The NAVSEA 03 Distance Support Program is working with the Sea Warrior/Integrated Learning Environment team to include Navy Knowledge On-Line (NKO), Five Vector Model (5VM), Learning Management system (LMS), learning content management and delivery, Electronic Training Jacket (ETJ), and Career Management System (CMS) features. While one size may not fit all requirements, it is in the Navy's interest to fully examine current funded Sea Warrior/Integrated Learning Environment capabilities as a necessary input prior to new development.

As Sea Warrior and the Revolution in Training transform our manpower, personnel, and training business processes, we must fully integrate these processes in the acquisition of our new systems and platforms.

Balancing the Force profile with quality people, both within and among ratings (skill and experience mix), is a primary focus of the Navy's Strategy for our People. Additionally, technological advances in Navy systems require higher quality and more experienced Sailors to succeed in a more complex environment. These efforts to correctly align the skills and experience will enable the Navy to better meet emerging requirements from the Global War on Terrorism, successfully continue the missions in Iraq, and accomplish future mission requirements.

Continued emphasis on recruit quality and priority rating requirements has ensured a strong inventory from which to shape and transform Navy manpower. The Selective Reenlistment Bonus (SRB) continues to be the single most successful tool for shaping the enlisted force. The employment of the Perform-to-Serve Program for First Term Sailors has enabled better alignment of personnel and encouraged migration into undermanned critical skills. Within the officer corps, targeted programs such as Nuclear Officer Incentive Pay, Surface Warfare Officer Career Incentive Pay, and Aviation Incentive Pay continue to enable retention of critical URL officers and ensure adequate manning levels at specific career points.

We have made great progress toward shaping the force profile and aligning personnel inventory to requirements at all points along the length of service. However, additional effort is needed as we transform the force. Transformation challenges will require even greater focus, energy and resources in recruiting, training and retaining the highest quality professionals. The Navy must continue to commit the necessary resources to minimize personnel gaps, which will become critical in achieving a culture of readiness and rapid response. Future success in retention of high quality officers and Sailors will require Navy's continued strong commitment to targeted retention incentives.

MANNING NEXT-GENERATION WARSHIPS

As the Navy to constructs new warships such as DD(X) and LCS, conserving affordability and still maintaining the highest operational effectiveness have generated a holistic, system-of-systems approach to minimize total ownership costs throughout the lifetimes of these future warships. Indeed, optimizing DD(X) and LCS crews has meant that these programs started with a "clean sheet-of-paper" approach to surface warship manning. In light of this, the Navy is approaching the future Surface Combatant Family of Ships programs with the Sailors' needs and capabilities fully taken into account, up front, in systems and ship design, well before construction begins.

In order to ensure that these and other new-platform programs' optimal-manning goals can be met, the Navy is addressing the need for changes in manning and training processes and policies to take full advantage of system automation and improvements in shipboard processes. To that end, manpower specialists are working closely with engineers, scientists, researchers, and designers to ensure that they are taking a human-centered approach to meeting manpower and warfighting requirements. Likewise, training experts are focusing on the expectation that Sailors walk onboard a future DD(X) as "full-up rounds," already fully qualified to do their jobs in an individual and team-centered approach. This philosophy is shaping the Navy's approaches to LCS, DD(X), and CG(X) warships, and has application throughout the service. Indeed, the need to address current and future training needs was the focus of the CNO's Executive Review of Navy Training (ERNT), completed in the summer 2001.

SEAPRINT

SEAPRINT (Systems Engineering, Acquisition and Personnel Integration), the Navy's Enterprise approach to Human Systems Integration, provides a proactive approach to defining, developing and managing the future Naval Force. SEAPRINT is a clearly articulated approach that includes specific program management controls and a technical process designed to ensure that human considerations are adequately and timely addressed in system development. The goal of SEAPRINT is to achieve mission success through maximizing human performance while minimizing life cycle costs. SEAPRINT supports the *Sea Power 21* capability pillars (Sea Shield, Sea Strike, and Sea Basing) and provides linkage between these and the enabling pillars (Sea Warrior, Sea Trial, and Sea Enterprise).

SEAPRINT programs engage Manpower, Personnel, Training and Education (MPT&E) components in capability definition and system development activities. This allows systems engineers, specifically human factors engineers, to trade-off system design features (such as automation) with manpower, personnel and training requirements. The result is a better balance between mission capability, total force management and life cycle cost.

SEAPRINT is rooted in DoD policies and processes, and addresses human capability requirements in terms of knowledge, skills and abilities. As other Services embrace a similar approach, SEAPRINT can be a foundation for a DoD-wide approach HSI and total force management. A SEAPRINT-like approach applied across DoD could facilitate an integrated DoD workforce management strategy.

RECRUITING

The mission of Navy Recruiting is to attract high-quality men and women into the enlisted and officer programs for the U.S. Navy, its active and reserve components.

Commander, Navy Recruiting Command (CNRC) is in the midst of a multi-year transformation initiative focused on maximizing organizational effectiveness and efficiencies. The consolidation effort is integrating the Active and Reserve component recruiters and their processes. The restructuring effort is producing savings by eliminating excess overhead while executing the Base Realignment and Closure (BRAC) 2006 realignments. The current plan calls for all recruiting activity, both active and reserve, to be consolidated from four regional and one functional command into two regional commands. Recruiting Districts will be reduced from 31 to 26. Additionally, CNRC is executing the MPT&E realignment which will produce greater process efficiencies.

The Navy's recruiting efforts are focused in several areas, all designed to provide the fleet with the highest quality recruit with specific requisite skill sets needed by the Navy to win the war on

terrorism, deter aggression, preserve freedom of the seas, and promote peace and security.

Major recruiting program components include field recruiters with associated support, local and national advertising, and enlistment incentives.

The "One Navy" recruiting team is currently on a very successful run of meeting active duty accession and new contract goal for the past 53 months as of December 2005. Navy recruiting finished FY 2005 accessing 37,703 active duty recruits against a target of 37,635.

In FY 2005, CNRC continued to increase recruit quality, as 96 percent of enlisted accessions were High School Diploma Graduates (HSDG), 70.4 percent scored above the 50th percentile on the Armed Forces Qualification Test (AFQT), and 11 percent had at least 12 semester hours of college prior to joining the Navy. The mission success has led to 58 percent of FY 2006 accession mission already identified and in the Delayed Entry Program (DEP) at the beginning of this fiscal year. Recruits in the DEP learn physical fitness and Navy knowledge, allowing them to be better prepared for Recruit Training. Focused leadership and training in the DEP has had a positive effect on RTC attrition.

Recruiters face significant challenges. We are in a difficult recruiting environment due to an expanding economy producing low unemployment rates, declining propensity for influencers to recommend military service and an increase in quality standards. The youth market is shrinking. Seventy-two percent of its target population is ineligible for military service due to drugs, medical, legal issues and quality standards.

A very big part of Navy Recruiting success is traditionally due to the support received from citizens who influence young Americans, i.e., educators, youth workers, and various Friends of the Navy organizations (Navy League, Fleet Reserve Association, etc). This support is trending lower.

In a very competitive market for qualified diversity applicants, Navy recruiting continues to pursue and succeed in its attainment of African-American, Hispanic, and Asian Pacific Islanders/Native American recruits. Diversity recruits who had above average test scores rose in FY 2005 and diversity officer accessions increased by seven percent.

RETENTION

The Navy established the "Development of 21st Century Leaders" as one of its top three priorities, with the *Sea Power 21* vision focused on creating a Navy in which all Sailors are optimally assessed, trained, assigned, and sustained. This is routinely emphasized to all levels of Navy leadership, as is the strong commitment to readiness and quality of service. Positive, personalized leadership and mentoring combined with a variety of innovative programs have resulted in appreciable increases in aggregate reenlistment rates in FYs 2001-2005. This has been most noticeable among the critical first-term enlistment population where the reenlistment rate increased by 12 percent. This record setting reenlistment rate demonstrates the combined effects of leadership involvement in professional development, expanded reenlistment bonuses, enhanced special and incentive pays, increases in advancement opportunity, and significant quality of service improvements.

CENTER FOR CAREER DEVELOPMENT

One of the most successful elements in supporting the Navy's battle for people is the Center for Career Development (CCD). Established in 2000, CCD has become the centerpiece of the Navy's focus on retention. CCD collects feedback from the fleet and acts as the conduit for integrating their issues in the formulation of retention policy. It funnels energy and resources toward meeting retention challenges and provides the fleet with the necessary tools to strengthen retention efforts. These tools include enhanced professional training for Navy career counselors and retention teams, career management symposiums for Sailors and their families, and comprehensive, easy-to-use interactive products using the latest information technology. Career management symposiums are an excellent example of how aggressively the Navy is engaged in the fight to keep high-quality Sailors. The symposiums take a multi-pronged approach to educating Sailors on their career choices. For example, it provides Sailors with direct comparisons of total Navy compensation with that of civilian counterparts. They also provide an opportunity for Sailors to meet face-to-face with detailers who can discuss career options, conduct community status briefs, and even negotiate orders. Perhaps most importantly, CCD provides career management briefs to leadership teams, Navy leadership schools and quarterly "CNO's Best Retention Practices" messages to share Fleet retention initiatives. Since its inception, the CCD has visited 157 locations, interacted with more than 173,000 Sailors and family members, and convinced over more than 2,000 Sailors to reenlist who would have otherwise separated at the end of their obligation.

SELECTIVE REENLISTMENT BONUS

The Selective Reenlistment Bonus (SRB) program directly supports the Navy's Strategy for our People by focusing enlisted retention efforts on highly trained and specially qualified personnel, operating in those skills that are critical to a lean, high tech, sea-centric force. In FY 2004, SRB was applied to only 17 percent of active Navy enlisted skill sets; however it resulted in 13,649 reenlistments (41 percent of all Navy reenlistments). These reenlistments were not only for service contracts 1-2 years longer than the majority of Navy reenlistments, they were also in the specialized skills and levels of seniority that the Navy must maintain and in some cases (e.g., special warfare) increase, even as the non-SRB and traditional support skills are targeted for reduction.

As the Navy progressively becomes leaner and more dependent on technological advancements, retention of highly trained, technologically skilled Sailors becomes more critical. The inherent flexibility and responsiveness of the SRB program enables Navy to proactively stay in front of projected changes in evolving Fleet skill-mix requirements. Future success in retention is contingent on the Navy's continued strong commitment to SRB and development of additional incentives that make the Navy the employer of choice for a highly technical workforce operating in an increasingly demanding work environment.

THE NAVY RESERVE

The Navy Reserve was an active participant in the Global War on Terrorism in 2005, with more than 5,800 Navy Reservists mobilized in support of worldwide operations during the course of the year, maintaining a mobilized force presence of about 3,300—including Marine Corps medical support, overseas port security, port cargo handling operations, logistic airlift support, Combatant Commander staff augmentation, and CONUS force protection. The Navy Reserve is demonstrating its relevance on a daily basis and, by adapting to a changing world, will remain a key part of tomorrow's Navy.

QUALITY OF SERVICE

The mission of Navy Morale, Welfare, and Recreation (MWR) is to provide high quality support and recreational services that contribute to retention and readiness by improving the mental, physical, and emotional well being of our Sailors. MWR enhances Quality of Service for Sailors and their families by providing a variety of programs promoting recreation, social, and community support activities on Navy facilities worldwide. MWR programs provide active-duty, reserve and retired Navy personnel and their families with sports and physical fitness activities, outdoor recreation, value priced tickets to entertainment and tours, and a variety of food and beverage services. Additionally, child development and youth programs provide safe, affordable and quality childcare for almost 47,000 children of Navy families.

DEPLOYED RECREATION

Navy MWR also provides direct support to Commanders deployed in support of the nation's war on terrorism. Every ship is outfitted with a full complement of state of the art fitness, recreation and library equipment. Afloat recreation and fitness coordinators are embarked with many deployed aircraft carrier strike groups and expeditionary strike groups to provide physical fitness and stress-relief opportunities, significantly contributing to improved readiness and morale. As an added benefit, Sailors at sea and in remote forward areas have a large library of movies and are now seeing motion pictures within a very short time after their release in theaters stateside.

FAMILY SUPPORT

On the home front, the Navy's Fleet and Family Support Program (FFSP) ensures Sailors and their families are ready to meet the challenges of deployments by providing pre-, mid-, and post deployment programs for use by unit commanders. FFSP is also enhancing its spouse-employment program by providing career training and expanding linkage to employment opportunities. Other major FFSP programs include personal financial management, family advocacy, transition assistance, relocation assistance-crisis intervention, and individual, marital and family counseling, all of which have a direct and positive link to readiness. FFSP programs are accredited by Navy-wide system of quality and service delivery standards. FFSP programs are delivered at 55 sites worldwide. The Navy has augmented current center-based services by offering Navy One Source, a contract information and referral service, to expand support services to members and families of reserve, recruiting and remote assignment personnel and those requiring "24/7" access by toll-free 1-800 phone and internet information services.

KEY SEA WARRIOR PROGRAMS

CNATRA Naval Aviation Training Aircraft

Description

Commander, Naval Air Training Command's (CNATRA) mission, the on-time delivery of aviators (USN/USMC/USCG pilots and military flight officers) trained with leading edge technologies, is key to affordable fleet readiness and *Sea Power 21*. CNATRA's training aircraft inventory include the T-34C TurboMentor, T-6A Texan II, TH-57, T-2 Buckeye, T-45 Goshawk, T-44A Pegasus, TC-12 Huron, and the T-39 Sabreliner.

The first aircraft that all aspiring future USN/USMC pilots and flight officers fly is the T-34C TurboMentor (pilots) and the T-6A Texan II (flight officers). The T-34 started its Navy career in 1977 and has successfully and honorably completed its service at NAS Pensacola where it was a primary training aircraft for student Naval Flight Officers (NFOs). While still in use at NAS Whiting

Field and NAS Corpus Christi, the TurboMentor is scheduled to be replaced with the T-6A Texan II in FY 2011 at Whiting Field and FY 2015 at Corpus Christi.

The T-6A Texan II is one component of the Joint Primary Aircraft Training System (JPATS) along with simulators, computer-aided academics, and a Training Integration Management System (TIMS). The aircraft, built by Raytheon Aircraft Company, is a derivative of the Swiss Pilatus PC-9 aircraft with a Pratt & Whitney PT-6A-68 engine, digital cockpit, Martin-Baker ejection seats, cockpit pressurization, and an onboard oxygen-generating system. In FY 2007 the Navy will resume full-scale procurement of the T-6.

The T-2C Buckeye is used for the tactical maneuvering portion of Strike/Strike-Fighter NFO training at NAS Pensacola. Designed in the mid-1950's, the Buckeye is scheduled to be divested by FY 2010 and it will be replaced by the T-45 Goshawk. The T-45 Goshawk, the Navy version of the British Aerospace Hawk aircraft, is used for the intermediate and advanced portions of the Navy/Marine Corps pilot training program for jet carrier aviation and tactical strike syllabus. Upgrades to the T-45 include converting all analog cockpits (T-45A) to digital cockpits (T-45C), resolving an engine surge issue to make the aircraft more fuel efficient and safer to operate, and extending service life until 2030. The T-45 is currently in production, and the Navy is scheduled to procure aircraft through FY 2007.

The TH-57 Sea Ranger, a derivative of the commercial Bell Jet Ranger 206, is the Navy's sole advanced rotary training platform used at NAS Whiting Field. Upgrades to the TH-57 currently underway include energy attenuating seats, exceedence warning systems and a digital cockpit, guaranteeing aircraft availability and relevance to 2025.

The T-44A Pegasus and the TC-12 Huron are both twin-engine, pressurized, fixed-wing aircraft that are used for intermediate and advanced training for multi-engine aircraft. Future upgrades to both aircraft include wing wiring (T-44A), simulator visual upgrades (T-44A) and digital cockpits (T-44A/TC-12).

The T-39 Sabreliner is a multipurpose low-wing, twin-jet aircraft that has been in Naval service since the early 1990's. The primary mission of the Sabreliner is to conduct intermediate and advanced training for Strike/Strike-Fighter NFOs. The T-39 will also be replaced by the T-45 in the NFO syllabus.

CNATRA has recently charted a course to revolutionize NFO training by utilizing the T-6, the T-45C with Virtual Mission Training System, and high fidelity simulators to train future NFO's. This new training program will capitalize on cutting edge technologies, while allowing the Navy to divest two aging platforms (T-2, T-39). The new program is planned for IOC at NAS Pensacola in FY 2010.

Status
T-45 and T-6 currently in production. T-45 procurement planned for six aircraft in FY 2006, 12 in FY 2007, to meet inventory requirement of 223. Line shutdown scheduled for FY 2008. U.S. Navy procurement of the T-6 scheduled to resume with 21 aircraft in FY 2007 and 48 in FY 2008. Planned inventory objective is 328 aircraft.

Developers
T-6: Raytheon; Wichita. Kansas
T-45: Boeing; St. Louis, Missouri

Electronic Military Personnel Record System (EMPRS)

Description
EMPRS is the Navy's solution to the DoD initiative to standardize military personnel record management. It is a digital image-based record management system serving as the repository for all active, reserve, and retired Navy officer and enlisted records. EMPRS supports the functions of career management, promotion, assignment, casualty management, mobilization, and readiness. It is also used to satisfy personnel data requests by local, state, federal, and congressional agencies. In the future, the military personnel record will be expanded to include business functions and processes supporting the entire military personnel lifecycle, with an infrastructure permitting multiple levels of access to that record (e.g., corporate, field, member). This will move EMPRS significantly towards a "paperless" environment that can be managed across multiple networked architectures (e.g., WWW, LANs, WANs, MANs). Corporate record management, enabled by EMPRS, NSIPS, and eventually DIMHRS will allow the appropriate Functional Area Manager (FAM) of a particular personnel function and the member to update and view content of the military personnel record.

Status
EMPRS began a technology refreshment project in March 2003. The more stable, reliable, and flexible system is in place to support personnel management functions in both DIMHRS and Sea Warrior initiatives. Major components of the upgrade include IBM Content Management, eRecords COTS applications, and EMC storage equipment. The system includes the capability to "failover" operations to a geographically separate location in the event of an emergency in the prime operational location.

Developers
SAIC; Huntsville, Alabama
CACI International; Arlington, Virginia
IBM; Bethesda, Maryland